MAY 7 1931

DICAL ROOM
RAL LIBRARY
V. OF MICH.

STEEL

For forty-eight years—IRON TRADE REVIEW

May 7, 1931

Ajax-Northrup Induction Furnaces at Lebanon Steel Foundry, Lebanon, Pa.
Capacity—11 tons per 24 hour day—one-half ton per charge

BECKER OVENS

COKE AND GAS

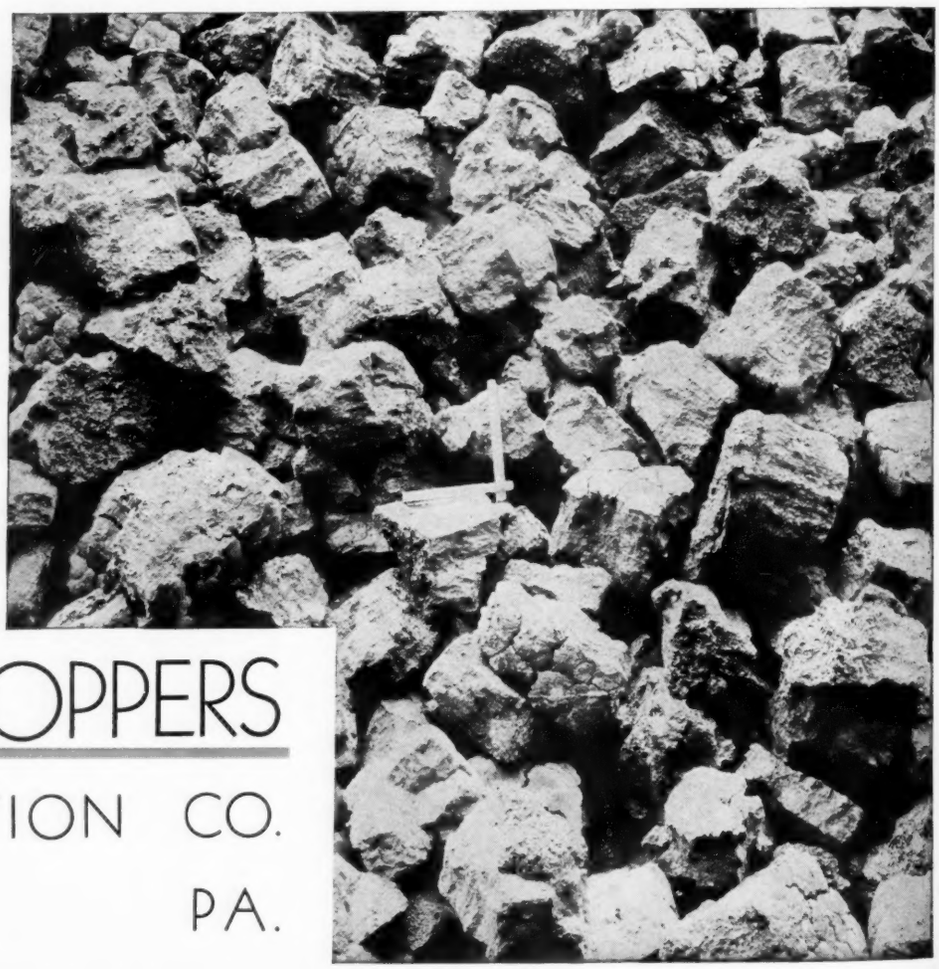
FROM BY-PRODUCT OVENS

No commodity is prepared with greater attention to the needs of the American community than Koppers Coke. Clean and attractive itself, it heats without soiling air, property, or person.

In industry, its history is a succession of new high records for efficiency.

Koppers by-product coke and gas plants express the years of experience that have brought coke to its present status.

Write for your copy of the booklet—«Becker Oven By-Product Coke And Gas Plants».



THE KOPPERS
CONSTRUCTION CO.
PITTSBURGH PA.

Vol. 88, No. 19, May 7, 1931, issue of STEEL, published weekly at Cleveland, O. Entered as second class matter at the post office, Cleveland, O., under the act of March 3, 1879. Subscription $6 a year in U. S. and Canada; foreign £2:0:0; single copies, 25c.

STEEL

PRODUCTION

PROCESSING

DISTRIBUTION

USE

EDITORIAL STAFF

E. L. SHANER
EDITOR

ASSOCIATE EDITORS

E. C. BARRINGER — E. F. ROSS
A. J. HAIN — J. D. KNOX
G. H. MANLOVE — W. H. LLOYD
GUY HUBBARD

New York

E. C. KREUTZBERG — B. K. PRICE
H. R. SIMONDS

Pittsburgh
W. G. GUDE

Chicago
F. B. PLETCHER

Washington
L. M. LAMM

London
VINCENT DELPORT

ADVERTISING STAFF

G. O. HAYS
BUSINESS MANAGER

New York

J. F. AHRENS — E. W. KREUTZBERG

Pittsburgh

S. H. JASPER — C. B. HUMPHREY

Chicago

L. C. PELOTT — C. A. WARDLEY

Cleveland

JOHN HENRY — R. C. JAENKE

F. F. LIGHT, *Circulation Manager*

CONTENTS

May 7, 1931

THIS WEEK IN STEEL 21

- Wages, Prices Farthest Apart in Busy Era 23
- Wage Cut Would Be Boomerang, Says Weirton Head 24
- Flat Rolled Meeting Studies New Sheet Classifications 25
- Bethlehem Cuts Dividends as Profits Fall 27
- Current Statistics of the Steel Industry 28
- April Pig Iron Rate Increases Slightly 29

Industrial Men in the Day's News 30
Obituary 31
Mirrors of Motordom 32
Here and There in Industry 33

EDITORIAL—Foreign Trade Well Held on Quantity Basis 34
THE BUSINESS TREND 35

High-Frequency Induction Furnace Affords Heat Uniformity 39
Butane, New Industrial Gas, Shipped as Liquid 42
Induction Motors Conserve Power in Operation of Larry Cars 46
Rivets or Welds?—By Lee H. Miller 48
Controls Open-Hearth Reversal by Temperature Difference 53
Three Major Factors Cause Most Paint Failures 61
Self-Propelling Gantry Crane Serves Ocean Vessels 62
1930 Steel Output Shrinks Sharply 64
Announce Papers for Symposium in Chicago 67
New Books Worth Reading 68
Scanning the Technology of Steel 75
Machine Tools and Plant Equipment 76

MARKET SUMMARY 89
MARKET REPORTS AND PRICES 90-120
CONSTRUCTION AND ENTERPRISE 123
NEW TRADE PUBLICATIONS 126
WHERE-TO-BUY DEPARTMENT 127
ADVERTISERS' INDEX 160

STEEL is published every Thursday by PENTON PUBLISHING CO., Penton Building, Cleveland, O. C. J. STARK, *President;* J. D. PEASE, *Vice President;* F. V. COLE, *Secretary. Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers Association. Branch Offices: New York, 220 Broadway; Chicago, Peoples Gas building; Pittsburgh, Oliver building; San Francisco, Alto Building; Washington, National Press building; Cincinnati, Schmidt building; London, Caxton House, Westminster, S. W. 1.; Paris, 9 Rue de Londres; Berlin, Dahmerstrasse 64 A, Lichterfeld-West. Subscription in the United States, Canada, Cuba and Mexico $6 per year; in Great Britain and European countries £2:0:0.*

Entered as second class matter at post office at Cleveland under the Act of March 3, 1879.

Copyright 1931 by the Penton Publishing Co.

You Never Can Tell Where Lightning Will Strike

Joseph T. Ryerson, who founded this business in 1842 adhered strictly to a policy of concentrating his purchases with those who not only had the desire but also the ability to take care of him in an emergency. To this fact alone he attributed the life of this organization on at least two occasions* many years ago.

There is little doubt but that an under market price may be secured occasionally by shopping around. A few dollars may be saved . . . a chance taken on quality and delivery. But that is only half the picture.

No one knows when a general condition or some business influence; some invention or new situation in the industy may bring embarrassment. We all expect good business and continued success. But at best, even when the horizon is clear, it pays to buy from a strong dependable House that can cooperate with you when necessary.

*The Chicago Fire. Panic of 1857.

A few of the 1,001 products always in stock, offering the opportunity to combine orders, deliveries, checking, and clerical work. Immediate shipment is assured.

Bars	Sheets, Full Finished	Strip Steel	Forging Bars	Concrete Reinforcing
Structurals	Refined Iron	Rivets and Bolts	Babbitt Metal	Firmtread Plates
Rails	Screw Stock	Boiler Tubes and Fittings	Tool Steel	Small Tools
Plates	Turned, Ground and Polished Shafting	Welding Rod	Alloy Steel	Machinery, etc.
Sheets, Blk. & Galv.			Allegheny Metal	

JOSEPH T. RYERSON & SON INC.

Plants: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City

Representation in: Minneapolis, Rockford, Kansas City, Tulsa, Houston, Newark, New York, Denver, Los Angeles, San Francisco

RYERSON

STEEL-SERVICE

Volume 88 Number 19

STEEL

For forty-eight years—IRON TRADE REVIEW

PRODUCTION ◆ PROCESSING ◆ DISTRIBUTION ◆ USE

This Week in Steel

FOR three decades ending with 1920 hourly wage rates, representing a trustworthy composite of industry and the trades, and wholesale prices, reflecting food, shelter, clothing and various "key" commodities, virtually were Siamese twins. Over these thirty years wages were tending upward, moderately but progressively, and like the fable, wherever wages went prices were sure to go.

But these twins could not stand prosperity, and in 1920 came the parting. For a short time wages faltered, but soon they regained their aplomb and by steady marches recaptured the summit of 1920, not to furl the flag until 1930. Prices, after falling like a plummet in 1921, also steadied, and for another decade wages and prices paralleled (Page 23), though on widely-separated levels.

This was the era of great prosperity, when industry was being mechanized, when the United States was setting a new high standard of living for the world—all due, so the economists said, to this wide margin of wages over prices which they termed purchasing power. Maintain purchasing power and assure prosperity, was their prescription.

Which was borne out until the rout of the stock market in 1929 and the subsequent general depression of business. What heretofore had been a spring of living water for industry came under suspicion of being a stagnant reservoir which must be drained. This surplus of wages over prices some have come to appraise as a blister which must be pricked.

Would Another Cut Start Business Up?

If so simple an operation will heal business, steel is willing to undergo, it, but not until it is certain of the diagnosis. Typical of steel's position is the telling point made last week by the president of Weirton Steel at the Flat Rolled Steel convention at White Sulphur Springs. Pointing out (Page 24) that a 17 per cent reduction in flat-rolled steel prices in two years has not conjured up any tonnage, would not the further slight concession in price certain to be occasioned by a reduction in wages prove just as futile, he asked . . . . Incidentally, this position coincides with that of President Hoover, who has again been lauded (Page 26) by labor for his stand against wage reductions.

Steel Profits Reckoned in Cents

On the other hand, those who believe a further liquidation of costs in the steel industry is required find a powerful ally in the further publication (Page 27) of financial statements. United States Steel's showing of only 5 cents a com-

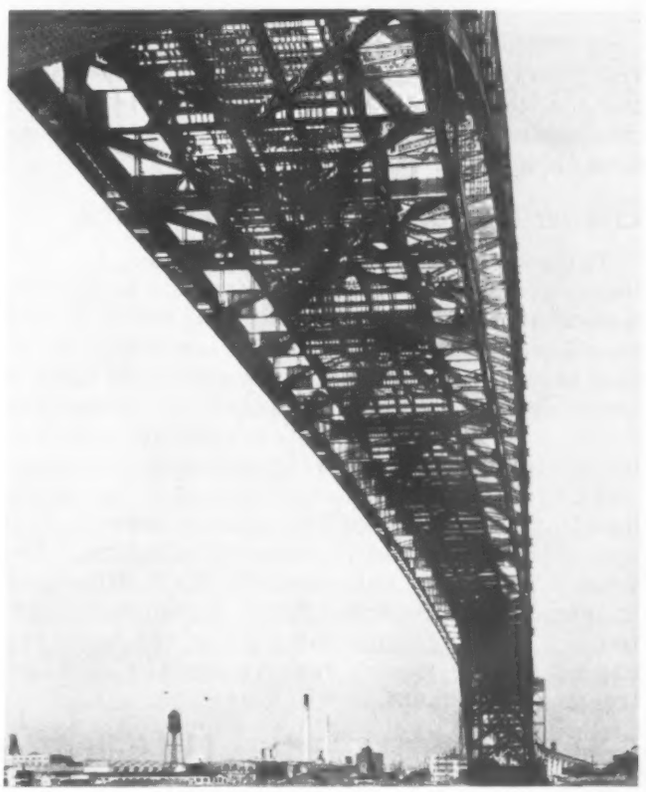
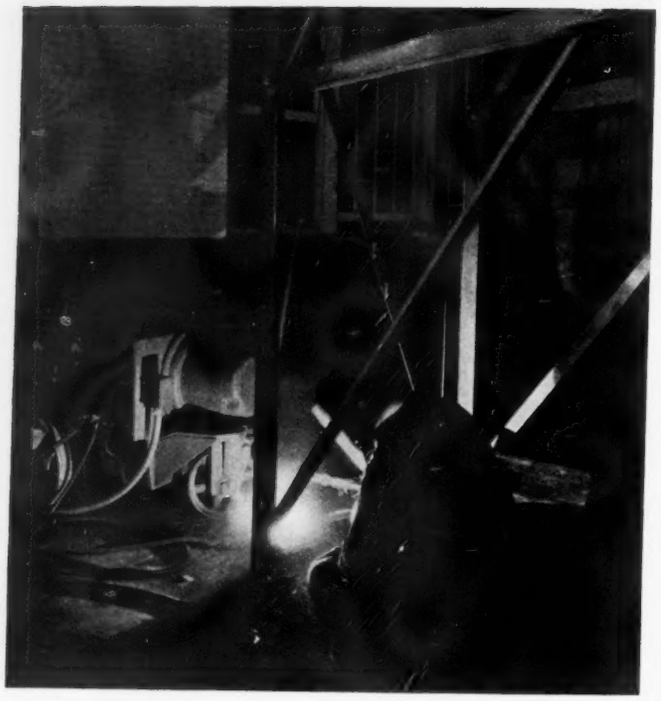


Photo Courtesy Port of New York Authority

An arch of steel: The Kill van Kull bridge as seen from the Port Richmond, Staten island abutment, looking toward Bayonne, N. J. The bridge, nearing completion, is 1675 feet between abutments



Mahomet goes to the mountain when a portable electric welding set is rolled to giant generators and other construction, instead of moving the job to the welder, at the East Pittsburgh, Pa., works of the Westinghouse Electric & Mfg. Co.

mon share earned in the first quarter is only fractionally bettered by Bethlehem's net of 6 cents a share . . . . For most smaller producers the comfort of black ink, even if only small figures, is denied.

Greater the Tonnage Larger the Deficit

These somber financial statements, for one thing, are prompting a revaluation of trade promotion activities. Of what use, asked a vice president of United States Steel last week (Page 25), is it to increase the consumption of steel if every additional ton means an additional loss? . . . . For another thing, they are a stimulus to invention, as for instance the development of automatic control equipment for open-hearth furnaces (Page 53) which conserves fuel and refractories and increases production. Reversals are made automatically by a difference in temperature recorded in the regenerative system. . . . In the same category is the widening use of butane gas as fuel (Page 42) in heat-treating equipment.

Continuous Mill More Than Holds Its Own

Strip, a comparative newcomer to the steel industry, did relatively better in point of production in 1930 than older forms of finished rolled steel, the American Iron and Steel institute points out in analyzing (Pages 64, 65) last year's results. Pennsylvania again accounted for more than one-third of all steel production, and with Ohio more than half. . . . This enviable position of strip provides the Flat Rolled Steel industry with a springboard for jumping off into a tremendous pentup demand, it was averred (Page 25) at the White Sulphur Springs convention. And no small credit for this position was claimed by fabricators, who see the building industry susceptible to broader use of steel.

Steel Encased, as Well as Steel Framed

Fabricators visualize rising to the skies an all-steel building, with steel frame, steel floors, exterior of insulated steel between steel window frames, ceilings of steel acoustically treated—just a dream today but an idea (Page 26) for trade promotion. A saving of only 3 inches per floor, possible through steel, means an added story for an otherwise 40-story structure. . . . Whether such all-steel buildings should be fabricated by riveting or welding rests with the designing engineer, but even with all main joints riveted opportunity exists (Page 48) for many times the amount of welding that the main frame would require. . . . Bethlehem Steel finally has confirmed rumors of many months' standing that it was acquiring (Page 26) three New York district fabricators, putting its fabricating capacity well over a million tons.

Ford Can Make or Break Auto Situation

As all roads led to Rome, so does all discussion of the automotive situation (Page 32) lead to Ford. With Chevrolet expanding its schedule and other manufacturers holding their own, will the indicated decline by Ford prevent May from recording the sixth consecutive monthly increase in auto production? Detroit looks for a Ford eight and a new Ford four; Reo and Graham plan new sixes; Packard is refurbishing its line; Chrysler is revising its eight. . . . Automobile manufacturers in particular have stimulated the development of highly-specialized types of tool steel, for whose production the high-frequency coreless induction furnace (Page 39) has been improved.

Markets Easier, Yet Strength Is Evident

Generalizations on the market situation become increasingly dangerous. Demand for steel has declined again, yet the movement is slight and encounters marked resistance. Indications are (Page 89) that steel buying is almost down to bedrock, and opinion still is widely expressed that an early fall upturn is probable. . . . April's daily rate of pig iron production developed a mild gain over March (Page 29) but the fact that for the first time this year the rising tendency in active blast furnaces was checked may portend a fall in May. . . . Like the markets, foreign trade in steel may not be judged too closely. If quantity rather than dollar value be considered (Page 34), the position of the United States is moderately encouraging.

Wages, Prices Farthest Apart in Busy, «Mechanized» Era

HOURLY industrial wages and wholesale prices parted company in 1921, after traveling along close together for more than 30 years. In the past ten years hourly wages have moved within a comparatively narrow range, near the peak. Prices after falling sharply in 1921 have remained within just as narrow a panel as that of wages. But, instead of being only ten points apart, as in most of the years prior to 1921, wages and wholesale prices since have been no closer than 70 points.

The index for wholesale prices dropped in one year, 1921, to the point where it was between 1916 and 1917. Hourly wages also declined, but much more conservatively. Wages always give ground more slowly than prices; they did not reach the bottom of that decline until 1922.

From 1922 to 1930 the line representing hourly wages has curved steadily upward, as if freed from the influence of ups and downs in wholesale prices.

Wages in 1929 were back to within one point of the 1920 peak, while wholesale prices were off 83 points. Though wages and prices turned downward in 1930, the former again exhibited a tendency to lag behind the movement of wholesale prices.

Reference to the accompanying chart will show that the upward course of hourly wages paid in the principal industries in the United States has not been arrested for more than two consecutive years at a time. After each depression they have moved to a higher level, with the exception that in 1929 they just barely touched the 1920 peak. On the basis of precedent alone, after this year they should resume an upward trend.

Widest Spread in Prosperity

Considered only in relation to wholesale prices, wage rates apparently have been defying the law of economic gravitation for the past ten years. It is significant that during this period, when the index for wages and that for prices have been the farthest apart, the United States experienced one of the greatest waves of prosperity in its history.

No alarm was felt or expressed because of the wide disparity between these factors; on the contrary it was believed that this was the ideal condition, high wage rates and low prices being made possible by heavy production and consumption.

On this basis the entire financial structure of the country was lifted up. But now the existence of the spread between wages and wholesale prices is pointed to as a reason why wages should be "adjusted."

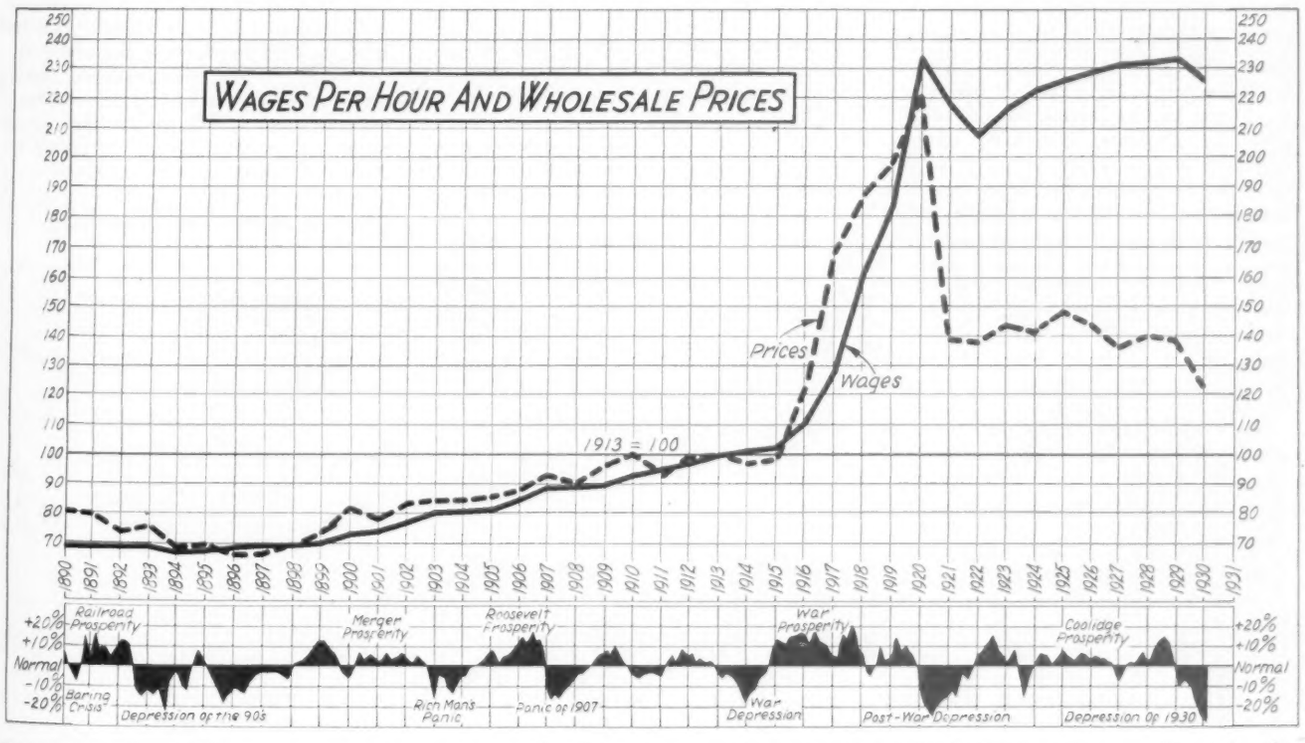
Hourly wages by themselves are not the true measure of the earners' income, which after all largely determines purchasing power. Many causes have contributed to the advancement of the rates, chief of which is the ever persistent urge toward higher standards of living. In this respect they are more properly an index of an aim, or an ideal, rather than an actual achievement—the achievement being to attain a combination of high wage rates and full-time hours of work, the degree of attainment representing the degree of prosperity.

Another significant fact is that wage rates have remained on a high level during a period when mechanization has made its greatest strides. Mechanization obviously has not tended to reduce the wage status of the workers to that of "common labor," but has put more workers in the wage class of skilled labor. This is shown by the higher index.

Due to reduced hours of employment wage earners' income is about 35 per cent lower than in 1929, and the majority of employers in seeking to uphold hourly wage rates have considered this fact. Income, as represented by payrolls, has moved more in consonance with wholesale prices than have hourly wages.

For example, the index for wages for 1930 was 226, only 7 points below 1929. Prices in the same time moved down 14.7 points. Industrial payrolls were cut about 20 points.

Though the present sometimes is referred to as "the worst depression," it



Regardless of periods of depression and prosperity, hourly wages show a constant tendency to advance. In prosperity, they enhance the wage earners' position; in depression their significance is diminished by loss of work and income

is interesting to note that between 1920 and 1921 the index for wage rates dropped 16 points; wholesale prices, 81.6 points, and payrolls, 41.3 points, the decline for all three factors being much more severe than in 1930.

The index for wholesale prices, compiled by the bureau of labor statistics, includes farm products, foods, leather and textile products, fuel and lighting, metals and metal products, building materials, chemicals and drugs, house furnishings, and miscellaneous products. The index for hourly wages, also compiled by the bureau, includes all industries in the United States other than agriculture. The index figure for hourly wages for 1930 has been computed from various sources.

Which way are these factors now headed? Wage rates thus far this year have shown a tendency to decline moderately. The exact monthly indexes for the country's principal industries are not yet available. In the state of New York, where the wage index in the past has followed fairly closely the national figure, January witnessed a further decline, followed by a slight recovery in February.

The national index for industrial payrolls has increased 6 or 7 points since January. Wholesale prices after yielding slightly in February showed a tendency to stiffen, and for March the price index was slightly higher.

A banker-economist of national prominence views the near future in this light: There are three alternatives in the present problem—lower wage rates, raise prices, or increase production.

"This country has been and is producing much less than necessary for its needs," he says. "Under sheer compulsion there is very likely to be a recovery in activity this fall. It will come before wage rates are seriously disturbed."

Economy "Contagious"

ANATIONALLY known banker-economist recently inspected all the tires on automobiles parked at the noon hour in private grounds at the rear of a millionaires' clubhouse.

"I wanted to see," he said, "if those tires were worn smooth, or if they were new, or comparatively new. Any one who holds membership in that club is financially able to have his car equipped with good tires.

"I found practically all the tires were worn down smooth, many needing replacement. It is the same everywhere. Even those whose wages or salaries have not been reduced are making things 'do' longer than usual. Contagious economy is interfering to a large extent with normal expenditures, tending to retard business."

Wage Cuts Would Only Be Boomerang, Retard Recovery, Says Weirton Head

HOW can a 10 per cent cut in the wages of steel workers, with a resulting reduction of less than $1 a ton in the prices of steel mill products, possibly contribute to the recovery of prosperity, when price reductions amounting to 17 per cent in the past two years have not only failed to stimulate demand but have actually been accompanied by lessened sales?" asks John C. Williams, president, Weirton Steel Co., Weirton, W. Va., at the convention of the National Association of Flat-Rolled Steel Manufacturers at White Sulphur Springs, W. Va., last week.

With the highest wages paid at present to common labor ranging around 45 cents an hour, Mr. Williams emphatically believes wages are none too high. In his opinion, the long term trend, abroad as well, is toward better standards of living. In this progress toward more wholesome living conditions for workers America must continue to lead the way.

Under present wage scales mill employes, to a limited degree, enjoy the pleasures and comforts derived from the products made from the steel they produce, Mr. Williams said. This opportunity to partake of the enjoyments embodied in higher living standards should be enhanced, rather than curtailed.

Six hundred thousand workers are directly engaged in the production of steel and an additional 400,000 men indirectly find their livelihood in the activities of the steel industry. Widespread wage reductions in the industry, points out Mr. Williams, would cripple the purchasing power of this major group of consumers and would seriously retard the return to normal prosperity.

In recent years, he recounts, manifold efforts have been made to enlarge the markets for steel products. Is it consistent to check this important development by making it impossible through wage reductions for millions to buy these products?

Furthermore, said Mr. Williams, the industry itself would receive but fleeting benefits from a reduction of wages, since any savings derived from lower wages would be passed along to consumers within a fortnight. The Weirton Steel Co., he advised, has not reduced any of its payrolls and is not thinking of reducing wages.

Steel Plants Report Gain in March Employment

Washington—An increase of 1.5 per cent in the number employed at 190 iron and steel plants is reported for March, over February, by bureau of labor statistics. Their payrolls advanced 4.4 per cent. Forty-five cast iron pipe plants show a gain of 3 per cent in employment, and 8 per cent in payrolls. Reports from 174 structural fabricating plants gave a net decrease of 0.5 per cent in employment, and reduction of 1.1 per cent in payrolls. A drop of 0.2 per cent in employment, but a gain of 1.3 per cent in payrolls is noted for 148 machine tool plants.

Manufacturers Prepare To Increase Employment

New York—A survey of 748 companies, employing nearly 500,000 workers, in 23 basic industries, by the National Association of Manufacturers indicates a "permanent and continued gain" in employment, the association announces. Seventy-eight of the companies report they will add to their personnel this summer, the prospective increases ranging from 5 to 100 per cent. Six hundred and three said they will also make no further reductions.

Opposes Wage Cutting

Philadelphia — A proposed industrial employment code discussed at a meeting here of the Taylor society terms wage cutting "demoralizing," recommends an 8-hour day as a maximum and urges closer relation between employers and employes.

Dam Labor To Get 50c

Washington—Unskilled labor will be paid a base rate of 50 cents an hour in the construction of the Hoover (Boulder) dam, officials of Six Companies Inc., the contractors, have advised the government.

Institute Elects Directors

New York—American Iron and Steel institute at its annual meeting Monday (not to be confused with the spring meeting scheduled for May 22) elected the following directors for the class expiring the first Monday in May, 1934: E. A. S. Clarke, E. R. Crawford, George G. Crawford, W. J. Filbert, W. W. Holloway, Samuel Mather, Frank Purnell, Harry E. Sheldon, George M. Verity and H. D. Williams.

Flat Rolled Meeting Studies New Sheet Classifications

WHITE SULPHUR SPRINGS, W. VA.—Searching studies of the production and technical problems involved in the new sheet steel classification program, described in full in STEEL for April 23, engaged the major attention of the executives of the flat-rolled steel industry who convened here April 30 and May 1 and 2.

After carefully analyzing the various types of sheet mills in use today and the varieties of grades they can produce, it was the consensus of individual members that all of the many components that go to make up the output of sheet steel mills can be integrated into a greatly simplified and standardized whole by means of the plan proposed by the American Rolling Mill Co.

Essentially, the plan eliminates many of the grades formerly described by processes and by ultimate usage, and affords instead three fundamental grades—hot-rolled sheets, hot-rolled annealed sheets, and cold-rolled sheets—which will comprise the basis of purchasing sheets regardless of the purpose or application intended.

Thomas Advocates Restraint

All association efforts are at a crisis, in the opinion of E. P. Thomas, vice president, United States Steel Corp., who spoke briefly at the trade promotion meeting May 1. All cooperative activities to broaden markets will prove abortive, he believes, unless members can show a profit on their operations.

"Of what use is it to increase the consumption of steel, if every additional ton sold means a further financial loss?" he asked. In self restraint of individual mills he sees an opportunity for industrial stability, production being proportioned to the going demand. He expressed himself as being in accord with the program adopted generally by the steel industry to maintain wage scales.

The sheet steel industry has reached the end of the most trying year in its history according to George H. Charls, president, National Association of Flat Rolled Steel Manufacturers, who addressed the opening session, April 30. In less than two years, Mr. Charls stated, price reductions on cold-rolled steel products have averaged more than 17 per cent and sales have been cut in half.

Points to Potential Demand

Withal, the steel industry as a whole has met the problem of employment efficiently, maintaining five-sixths of its employes on full or part time payrolls. He urged the practical use of organized knowledge of the past and advocated sustained wages to preserve buying power. Apprehension, he said, has induced under-consumption which is being translated into a tremendous pent-up demand.

Effectiveness of the market promotion activities of the trade research division of the National Association of Flat Rolled Steel Manufacturers was demonstrated through a series of charts and displays showing the gains in tonnage of flat-rolled steel sold in 1929 and in 1930 as compared with 1924. Detail and comparative figures were published in STEEL for April 30.

Employment of field engineers to search for new markets and to promote the use of flat steel, particularly in the building industry, was urged by F. C. Gifford, vice president, Acme Steel Co., Chicago. Investigation of the uses of flat steel in building construction in Chicago, undertaken by Mr. Gifford, revealed a passive attitude on the part of many architects toward the adoption of the many new building products fabricated from steel. In his opinion the use of steel for doors, windows and trim, and similar applications has lagged in the Middle West as compared with New York and other eastern cities.

Fabricators have been, and are today, responsible for the consumption of millions of tons of flat-rolled steel, according to C. I. Auten, Truscon Steel Co., Youngstown, O., who emphasized the service the manufacturers of steel products have rendered the steel industry. In the building and construction fields he sees the next important market for steel and steel products.

Wood and stone from the beginning have been the natural building materials for man, he pointed out. The use of steel has been a recent development and its further acceptance as a major building material demands a consistent program of educational and sales effort to bring its manifold advantages before those responsible for building specifications.

Fabricators Carry Sales Costs

Up to the present, the fabricators have taken the lead in merchandising steel to the building industry, spending some 20 cents of each market dollar in selling, compared with 1½ cents that the steel mills allocate to sales costs. Additional sales efforts on the part of the steel mills, Mr. Auten believes, will hasten the acceptance of steel products in the building industry and will quickly provide a satisfactory outlet for surplus capacity.

The cloud has a silver lining, however, said Mr. Auten; leading architects and engineers are visualizing buildings of steel. They appreciate

WITH the sheet steel executives at White Sulphur Springs, W. Va.: Left to right—P. F. Voigt, vice president, Allegheny Steel Co.; Walter E. Watson, vice president, Youngstown Sheet & Tube Co.; Charles R. Hook, president, American Rolling Mill Co.; J. H. Fitch Jr., vice president, Newton Steel Co.; J. S. Paterson, vice president, Seneca Iron & Steel Co.; N. J. Clarke, vice president, Republic Steel Corp.; K. L. Griffith, president, Seneca company; R. J. Wysor, vice president, Republic corporation; B. F. Fairless, executive vice president, Republic corporation; John P. Hosack, vice president, Mahoning Valley Steel Co.; H. A. Roemer, president, Sharon Steel Hoop Co., G. L. Wick, Mahoning

that bricks upon each other, brick upon brick, story upon story, with a dead weight of from 90 to 200 pounds a square foot, supported at each floor level, is an illogical setup and is not in harmony with modern architecture.

Buildings are designed to serve, he declared, and 3 inches saved in the thickness of each floor of a 40-story building means another complete floor without additional height with lower unit costs and increased revenue. Architects, designers, and fabricators of vision see mounting into the skies an all-steel structure with a steel frame, steel floors, exterior insulated steel walls between steel windows, ceilings with steel acoustically treated, steel partitions; in fact, every element of their building built with steel.

W. E. Humphrey, federal trade commissioner, discussed trade pactice conferences.

Bethlehem Takes Over Three Fabricators

Bethlehem Steel Corp., Bethlehem, Pa., has acquired the properties of three New York district structural shape fabricators, having a combined capacity of 180,000 to 190,000 tons annually—Levering & Garrigues Co., Dunellen, N. J.; Hay Foundry & Iron Works, Newark, N. J.; and the Hedden Iron Construction Co., Hillside, N. J.

President Grace of Bethlehem in announcing the acquisition April 30 indicated that the plants would be continued in operation, adding that the acquisitions were too costly to permit their dismantling. McClintic-Marshall Corp. division of Bethlehem will operate the three shops. With the McClintic-Marshall capacity of 700,000 tons yearly, Bethlehem now has annual structural fabricating capacity of approximately 1,100,000 tons. Another recent acquisition of Bethlehem is the Eastern Steel Co. plant, Pottsville, Pa., purchased from Luria Bros. & Co., Reading, Pa., this plant to be dismantled.

Bonus Proxies in Hotel Ballroom Marathon

New York—Seventy-two per cent of the Bethlehem Steel Corp. stock was voted April 14 in favor of continuing the bonus system, but up to May 5 tellers had not completed counting the votes. The meeting—as it still is officially designated—was adjourned at the close of April 14 from the corporation's registered headquarters, Fidelity Union Trust Co., Newark, N. J., to the ballroom of the Robert Treat hotel. As the ballroom was reserved for various other functions there have been numerous interruptions for the proxy tellers.

Meanwhile, the minority group has sent letters to stockholders saying the vote has no bearing on the rights of stockholders, anyway, as the court declared it had no legal importance, pending suit against the bonus system. This group is seeking power of attorney for more shares.

The Business Week In Washington

PRESIDENT HOOVER has issued an executive order establishing a council of personnel administration to develop a more effective system of personnel management in the federal government, which shall through co-operation with business, industrial and educational organizations make available to the government the latest developments in personnel management outside the government service. The president of the United States civil service commission is to be chairman of the council.

□ □ □

A delegation of labor leaders here last week approved the stand of President Hoover against wage cuts in industry.

□ □ □

Information gathered on the price base inquiry of the federal trade commission has been made available to the chief examiner of the commission for use in the senate inquiry dealing with cement.

□ □ □

A vigorous offensive against anti-trust laws at the next session of congress is forecast by the desire of business to maintain legal, fair co-operation, as expressed at the convention of the Chamber of Commerce of the United States last week.

Weir Sees Gain in Steel Needs; Employment and Production Advance

IMPROVEMENT in steel consumption is still small but it is on the increase," Ernest T. Weir, chairman, National Steel Corp., Pittsburgh, said recently. "The low earnings of the steel companies in no way justify any reduction in wages. Our largest customers are all opposed to wage cuts, even though they would result in lower steel prices."

□ □ □

April production of Budd Wheel Co., Detroit, was 200 per cent greater than that of March.

□ □ □

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., reports progressive gains in orders from January to April.

□ □ □

The worst of the depression is over and the time is at hand when the nation can really begin to rebuild its economic life, said Rome C. Stephenson, president, American Bankers' association, in a Halsey-Stuart radio broadcast.

□ □ □

Bendix Aviation Corp., Chicago, reports bookings in the first quarter $1,000,000 in excess of the last quarter of 1930.

□ □ □

Increased demand has put employes of the A-C Spark Plug Co., Flint, Mich., a division of General Motors, back on full-time employment of 9 hours daily, 5½ days a week.

□ □ □

"The future outlook for United Engineering & Foundry Co. is very promising, and with the business already booked and under way, 1931 earnings should approximate those of 1930," George T. Ladd, president, declared at the annual meeting of stockholders.

Foundry Convention Opens with Good Attendance

Chicago—More than 2000 executives, engineers, metallurgists and others affiliated with the foundry industry had registered by Tuesday noon for the thirty-fifth annual convention and exhibition of the American Foundrymen's association opening here Monday at the Stevens hotel. This registration exceeds the figure for the similar period of the 1929 convention and show held in the same place. An exceptional interest is being shown in the technical sessions, which are the most extensive ever arranged by the association.

Quits Bar Fabrication

Cleveland — Republic Steel Corp. has withdrawn from the concrete bar fabricating business in the Cleveland territory. This portion of the company's activities has been turned over to the Truscon Steel Co., Youngstown, O. The company will continue to sell concrete bars as heretofore.

Bethlehem Cuts Dividend as Profits Fall; Holds Wages

BETHLEHEM STEEL CORP., Bethlehem, Pa., had net income of $1,941,942 in the first quarter, which, less the preferred dividend of $1,750,000, left net income available for dividend on the common of $191,942, or 6 cents a share.

Common stock was placed on a $4 yearly basis and with the quarterly apportionment of $1 for each of 3,200,000 common shares, $4,950,000 was paid in total dividends, leaving deficit for the first quarter of $3,008,058.

Earnings of 6 cents a share compare with 17 cents a share earned in fourth quarter of 1930, and $2.60 per share during the first quarter of 1930.

Operations averaged 50.8 per cent during the first quarter of 1931 against 42.5 per cent in the previous three months and 80.8 per cent for first quarter of last year.

Value of orders on hand March 31, 1931, was $65,803,609. By comparison, December 31, 1930, found bookings valued at $68,426,595 and at the close of March a year ago $73,333,010.

"Bethlehem is continuing to maintain wage rates. The working force is practically intact, with the company distributing such work as there is in as equitable a manner as possible," President Eugene G. Grace stated.

In discussing the Bethlehem company's present ingot operating rate of 48 per cent, Mr. Grace said that incoming orders were not any more than supporting that rate and that, if anything, orders were on the weak side. He declared further that he could see nothing to indicate an immediate pick-up in demand for steel. On the other hand, Mr. Grace said he did not look for any material falling off.

There was a slight increase in the company's average billing price during the March quarter, as compared with the preceding quarter, also an increase in the volume of tonnage, these increases notwithstanding a decline in earnings. In part, this may possibly be attributed to increased interest charges and an increased provision for depletion and depreciation, both increases reflecting the purchase of the McClintic-Marshall Corp.

Wheeling Incurs Deficit

Wheeling Steel Corp., Wheeling, W. Va., reports loss of $628,623 for the first quarter. This compares with net profit of $1,253,224 for the first quarter of 1930. Profit from operations after federal tax in the 1931 quarter was $1,508,597, which, less $864,355 for maintenance charges left balance of $644,242. Depreciation, provision for exhaustion of minerals, interest and discount on bonds totaled $1,272,866, leaving loss of $628,623.

Republic Earnings Fall

Republic Steel Corp., Youngstown, O., reports net loss for the March quarter of $1,692,593, comparing with a profit of $1,357,769 in the first quarter of last year and net loss for year 1930 of $3,522,003.

Net gain from operations in the first quarter of 1931 after deducting $1,915,797 for plant maintenance and repairs, was $1,277,302. Interest on indebtedness was $918,324, leaving a profit of $358,978. This figure less provision for depreciation and renewal of plants of $1,976,571 resulted in a net loss from operations of $1,617,593.

Preferred dividends paid on guaranteed Trumbull-Cliffs Furnace Co. stock of $75,000 raise the total net loss to $1,692,593.

Sheet & Tube Has Loss

Youngstown Sheet & Tube Co., Youngstown, O., reports net loss of $822,909 for the March quarter, after interest, depreciation and other charges were deducted but before preferred dividends. This compares with net profit of $2,517,796 for first quarter of 1930. Net earnings from operations for the first quarter of 1931 were $1,331,871, after deducting repairs and maintenance items and other income was $385,456. Interest on funded debt and other interest charges was $925,490, leaving net profit before depreciation of $791,738. Depreciation was $1,614,648, thus leaving loss for the quarter of the aforementioned figure.

□ □ □

Wheeling Steel Corp., Wheeling, W. Va., directors have approved change in the capital structure. One share of "A" preferred 8 per cent stock would be exchanged for one and one-third shares of new 6 per cent preferred $100 par value stock; one share of "B" preferred 10 per cent stock would be exchanged for one and two-fifths shares of new 6 per cent preferred cumulative $100 par stock, and one share of common $100 par stock would be exchanged for one share of new common, no par value. Stockholders will vote on the proposed changes June 2.

□ □ □

Allegheny Steel Co., Brackenridge, Pa., earned net profit of $285,632 in first quarter, or 37 cents a share.

□ □ □

Granite City Steel Co., Granite City, Ill., reports profit of $88,146 in the March quarter, compared with $301,721 for the first quarter of 1930.

□ □ □

Eastern Rolling Mill Co., Baltimore,

Bethlehem's Financial Statement for First Quarter and Comparisons

	First Quarter, 1931	Fourth Quarter, 1930	First Quarter, 1930	Year, 1930	Year, 1929
Total income, including subsidiaries	$7,551,977	$7,418,383	$15,846,506	$45,233,664	$67,469,245
Less interest charges	1,842,454	1,628,090	2,162,049	7,172,517	11,217,180
Balance	5,709,523	5,790,293	13,684,457	38,061,147	56,252,065
Less depreciation, depletion and obsolescence	3,767,581	3,499,293	3,606,971	14,217,741	14,009,085
Net income	1,941,942	2,291,000	10,077,486	23,843,406	42,242,980
Preferred dividends	1,750,000	1,750,000	1,750,000	7,000,000	7,000,000
Common dividends	3,200,000	4,800,000	4,800,000	19,200,000	15,600,000
Total	4,950,000	6,550,000	6,550,000	26,200,000	22,600,000
Surplus for period	*3,008,058	*4,259,000	3,527,486	*2,356,594	19,642,980

*Deficit

reports net loss of $67,048 for the March quarter in comparison with profit of $11,501 for the same time of 1930.

□ □ □

Follansbee Bros. Co., Pittsburgh, reports net loss of $203,956 after depreciation, depletion and other charges for the first quarter, compared with net loss of $99,072 in the March quarter of 1930.

□ □ □

Ohio domestic corporation code has been amended to permit stockholders opposed to a merger to participate in dividends pending court action on the merger. The amendment is an outgrowth of the Youngstown Sheet & Tube-Bethlehem merger action initiated by Cyrus S. Eaton and associates, of Cleveland.

Babbitt Metal Shows Increase in March

After February's dip in both production and sales of babbitt metal, March reports to the department of commerce from leading manufacturers show gains. Both first-quarter sales and output lag perceptibly behind 1930:

In Pounds

1930	(a) Total production	(b) Sales	(c) Production for own use
March	5,429,440	4,402,000	1,027,440
(3 mos.)	13,956,976	10,984,231	2,972,745
April	4,036,260	2,994,023	1,042,237
May	4,072,853	3,139,884	932,969
June	3,912,744	2,742,435	1,170,309
July	3,060,962	2,160,505	900,457
Aug.	2,918,043	1,964,213	953,830
Sept.	3,892,287	1,850,468	1,041,819
Oct.	3,101,187	2,068,544	1,032,643
Nov.	2,695,087	1,904,256	790,831
Dec.	2,106,522	1,459,208	647,314
(Year)	42,752,921	31,267,767	11,485,154
1931			
Jan.	2,855,693	2,089,574	766,119
Feb.	2,507,222	1,819,749	687,473
March	2,661,211	1,829,477	831,734
(3 mos.)	8,024,126	5,738,800	2,285,326

(a) By 43 reporting establishments.

(b) By 33 manufacturers who produce for sale, including 5 who also report consumption of their own metal.

(c) By 15 establishments which manufacture their own metal, including 5 which also produce for sale.

Gray Iron Production in Five Point Jump

Production in the gray iron foundry industry took a five point jump in March over February and stood at 60.4 per cent of capacity, according to members of the Gray Iron Institute Inc., Cleveland. This was the third successive monthly gain.

New business was up 14 points to 66.9 per cent of capacity; unfilled orders were up 8 points to 47 per cent; material received gained slightly; material on hand was worked down moderately.

The business outlook was good for three foundries against two for February; 54 said it was fair, compared with a former 52; 58 believed the outlook poor, compared with February's 57; and 16 saw conditions in a bad light, as against 22 of the same opinion in the former month.

By districts, the Wisconsin, Illinois, and area west of the Mississippi river showed the greatest activity, and by normal volume class "A" plants.

Steel Barrel Output Continues Improvement

March output and shipments of steel barrels reached the highest level since October, 1930. Unfilled orders were improved likewise. Operations for 32 plants that report to the department of commerce were 39.9 per cent of capacity, up approximately seven points from February. Comparisons follow:

1930	Production	Shipments	Unfilled orders within 30 days
March	771,686	785,951	417,933
(3 mos.)	2,027,159	2,028,395	.....
April	769,061	766,617	322,161
May	731,087	736,147	393,843
June	651,559	638,358	319,754
July	617,420	621,091	311,630
Aug.	553,842	552,265	237,745
Sept.	564,927	565,204	253,745
Oct.	616,121	619,558	275,778
Nov.	497,539	500,409	230,960
Dec.	412,283	406,327	188,902
(Year)	7,440,998	7,434,371	.....
1931			
Jan.	421,814	427,622	210,416
Feb.	450,134	449,485	231,738
March	550,758	554,332	242,626
(3 mos.)	1,422,706	1,431,439	.....

Barrel Shipments Gain

Percentage of steel barrel-making capacity used during March was 33.2, comparing with 20.8 in February. Total daily productive capacity was 45,350 units for both I.C.C. and light barrels, in both March and February, according to the Steel Barrel Manufacturers' association, Cleveland.

Shipments for March totaled 328,956, considerably improved from February shipments of 271,788 and January, 247,045. Total number of barrels on unfilled orders on March 1 was 546,844 units.

March Boiler Orders Best

In March new orders for 630 steel boilers were placed, against 516 units in February and 598 in January. March's total aggregated 664,784 square feet; February's, 622,343 square feet. First-quarter totals show orders of 1744 boilers with an area of 1,863,850 square feet; a year ago 2792 boilers having 3,284,364 square feet total surface, according to the department of commerce.

March Betterment Shown in Steel Plate Orders

Steel plate total orders increased in March due to tank car, gas holder and miscellaneous classification gains. Department of commerce compilations show total orders and three major classifications:

In Tons

1930	Total	Oil storage tanks	Blast furnaces	Miscellaneous
Mar.	46,137	9,195	2,749	22,610
(3 mos.)	137,882	28,865	7,230	53,723
April	45,454	9,683	273	19,118
May	38,328	10,495	426	16,479
June	41,774	9,869	511	20,698
July	38,283	11,969	102	17,752
Aug.	36,513	10,056	750	21,910
Sept.	41,066	14,916	514	18,301
Oct.	30,197	4,518	231	18,665
Nov.	33,151	9,965	179	14,632
Dec.	26,787	5,118	135	13,227
(Yr.)	469,435	115,454	10,357	214,505
1931				
Jan.*	27,518	2,598	111	20,845
Feb.*	24,438	3,585	75	16,245
Mar.	31,056	2,538	833	21,697
(3 mos.)	83,012	8,721	1,019	58,787

*Revised.

March Structural Orders Are Highest Yet for 1931

Bookings of structural steel in March rose to the high for 1931, although shipments tapered below both February and January. March orders were at 46.4 per cent of capacity, or the highest since October, 1930. Following comparisons are by the department of commerce, based on reports from 211 fabricators:

	Bookings		Shipments	
1930	Tonnage	Per cent capacity (1)	Tonnage	Per cent capacity (1)
Mar.	236,800	59.2	264,800	66.2
3 mos.	743,200	61.9	774,800	64.6
April	222,800	55.7	284,000	71.0
May	279,200	69.8	265,200	66.3
June	253,600	63.4	280,000	70.0
July	270,000	67.5	274,800	68.7
Aug.	252,000	63.0	262,400	65.6
Sept.	155,600	38.9	243,200	60.8
Oct.	209,200	52.3	239,200	59.8
Nov.	151,200	37.8	195,200	48.8
Dec.	152,800	38.2	168,400	42.1
Year	2,689,600	56.0	2,987,200	62.2
1931				
Jan.	162,400	40.6	172,000	43.0
Feb.*	158,800	39.7	166,800	41.7
March	185,600	46.4	152,800	38.2
3 mos.	506,800	42.2	491,600	41.0

(1) Capacity: 1930, 400,000 tons.
*Revised.

April Iron Rate in Small Rise; 2 Fewer Stacks Active

PIG iron production in April registered another increase and marked the fourth consecutive month of improvement. However, the gain was only 1569 tons per day, or 2.4 per cent, and the smallest for any of the four months.

With a net reduction of two in operating blast furnaces, there is reason to believe that the 67,017-ton average daily rate of April represents the peak for this spring. During normal years iron production sometimes rises in May, but more often it drops.

AVERAGE DAILY PRODUCTION

	1931	1930	1929	1928
Jan.	55,337	91,573	110,742	92,113
Feb.	61,114	101,640	114,942	99,954
Mar.	65,448	104,930	119,662	103,199
Apr.	67,017	106,371	122,106	106,066
May	.....	104,564	125,753	106,219
June	.....	97,817	123,887	102,745
July	.....	85,110	122,016	99,120
Aug.	.....	81,455	120,845	101,193
Sept.	.....	75,893	116,548	102,120
Oct.	.....	69,851	115,747	108,824
Nov.	.....	62,182	106,081	110,155
Dec.	.....	53,732	91,513	108,702
Ave.	62,217	86,141	115,808	103,365

The average daily rate for March was 65,448 tons, while one year ago in April, a level of 106,371 tons was reached. Although operating furnaces on March 31 reached a total of 116, the largest number since last September when 126 were blowing, active units dropped back to 114 on April 30. No changes were noted in merchant stacks, but of the nonmerchant or steelworks class, four were blown out and two blown in.

Total production of iron in April was 2,010,534 gross tons, a loss of 18,372 tons from the 2,028,906 tons of March. April, however, was a 30-day month, as compared with the 31-day month of March.

APRIL PIG IRON PRODUCTION

	No. in blast last day of month		Total tonnage made	
	April	Mar.	Mer-chant	Nonmer-chant
Ohio	25	25	64,741	388,513
Pennsylvania	37	37	64,689	543,552
Alabama	13	13	109,561	72,217
Illinois	11	12	74,757	136,246
New York	5	5	36,747	44,484
Colorado	1	2		
Indiana	9	9		
Maryland	3	3	3,550	297,918
Virginia	1	1		
Wisconsin	0	0		
Kentucky	1	1		
Massachusetts	1	1		
Tennessee	1	1	14,153	78,725
Utah	1	1		
West Virginia	2	2		
Michigan	3	3		
Minnesota	0	0	16,531	32,829
Missouri	0	0		
New Jersey	0	0		
Spiegel and ferro—all states	....	....	9,038	22,283
Total	114	116	393,767	1,616,767

MONTHLY PRODUCTION

	1931	1930	1929
Jan.	1,715,443	2,838,751	3,433,028
Feb.	1,711,192	2,845,937	3,218,376
Mar.	2,028,906	3,252,822	3,709,518
April	2,010,534	3,191,119	3,663,167
May	.....	3,241,477	3,898,344
June	.....	2,934,508	3,715,104
July	.....	2,638,441	3,782,511
Aug.	.....	2,525,105	3,746,198
Sept.	.....	2,276,781	3,496,454
Oct.	.....	2,165,374	3,588,146
Nov.	.....	1,865,458	3,182,420
Dec.	.....	1,665,715	2,836,917
Total	7,466,075	31,441,488	42,270,183

a decrease of 4,662,554 tons, or 38.4 per cent.

Relating production to capacity, operations in April represented 46.5 per cent, a figure which was the highest since last October with 49.6 per cent. Operations in March were at 45.4 per cent and at 75.4 per cent in April one year ago.

April production was comprised of 393,767 tons of merchant iron and 1,616,767 tons of nonmerchant or steelworks iron.

Furnaces blown in during the month were: In Ohio: Mingo No. 2, Carnegie Steel Co. In Pennsylvania: One Eliza, Jones & Laughlin Steel Corp.

Stacks blown out were: In Ohio: Lorain No. 3, National Tube Co. In Pennsylvania: Edgar Thomson E, Carnegie Steel Co. In Colorado: One Minnequa, Colorado Fuel & Iron Co. In Illinois: One South Chicago, Wisconsin Steel Co.

RATE OF OPERATION
(Relation of Production to Capacity)

	1931[1]	1930[2]	1929[3]	1928[4]
January	38.4	65.0	79.0	66.8
February	42.5	72.1	82.2	72.5
March	45.4	74.5	85.5	74.8
April	46.5	75.4	87.4	76.8
May	.....	74.2	89.8	77.0
June	.....	69.3	88.5	74.4
July	.....	60.3	87.2	71.8
August	.....	57.8	86.4	73.3
September	.....	53.8	83.3	74.1
October	.....	49.6	82.6	78.9
November	.....	44.1	75.8	79.8
December	.....	38.1	65.5	78.8

[1]Based on capacity of 52,515,875 tons Dec. 31, 1930; [2]on capacity of 51,490,680 tons; [3]on capacity of 51,069,895 tons; [4]on capacity of 50,329,750 tons. Capacities by American Iron and Steel institute.

Class I railroads April 15 had 622,278 surplus freight cars in good repair and ready for service, according to the car service division of the American Railway association, a decrease of 6426 from April 8.

Revisions Noted in Steel Earnings Analysis

Herewith certain revisions are made in the annual financial analysis of the steel industry as presented in STEEL for April 23, page 36 and the accompanying supplement:

Earnings to capitalization, 1930, for Republic Steel Corp., 0.05 per cent.

Earnings to capitalization, 1930, for Granite City Steel Co., 7.50 per cent.

Earnings to capitalization, 1930, for National Steel Corp., 8.04 per cent.

Earnings to capitalization, 1930, for Lukens Steel Co., 1.79 per cent.

Earnings to capitalization, 1929, for Lukens Steel Co., 4.17 per cent.

Earnings to capitalization, 1930, for Pittsburgh Steel Co., 4.10 per cent.

Varying methods of accounting raise the total capitalization of National Steel Corp. to $114,606,668, and total capitalization for the twenty companies therefore to $4,376,909,581.

Consequently, the revised percentage of earnings of the steel industry upon its capitalization in 1930 was 4.54, compared with a revised 9.26 for 1929. The six-year average for the industry is 6.34 per cent.

Revised charts incorporating the above revision will be sent free to those requesting them.

Scrap Men To Play Golf For National Trophy

Institute of Scrap Iron and Steel Inc., New York, has announced a national golf tournament for its 400 members. The thirteen chapters will arrange field days during the summer to determine chapter champions. The final play-off will be in October, in connection with the semiannual convention of the Institute, at a city to be selected later. The three lowest scorers in each of the chapter play-offs will qualify to participate in the final tournament.

Herman D. Moskowitz, national president, has donated a cup, to be known as the president's cup, which will be awarded the winner of the tournament. John L. Spitzer, New York, is chairman of the national golf tournament committee of the institute.

Industrial Men in the Day's News

Herman D. Moskowitz, President, Institute of Scrap Iron and Steel Inc.

Photo by Blank & Stoller Inc.

TWENTY seven of his 40 years have been spent in one industry, scrap iron and steel, hence he is familiar with its many ramifications.

STARTING as office boy of M. Samuels & Sons, he rose to the vice presidency and general managership and then went with Schiavone-Bonomo Corp.

ACTIVE in the Eastern Scrap Iron association, he has been secretary of the national body since it was organized.

ENTERING the scrap industry as a boy of 13, Herman D. Moskowitz, who on March 12 became president of the Institute of Scrap Iron and Steel Inc., New York, has gained wide experience in all the ramified branches of the scrap iron and steel industry. At present he is vice president of Schiavone-Bonomo Corp., 11 West Forty-second street, New York. He was named president of the Institute at the recent annual convention at Cleveland, as noted in STEEL of March 19.

Mr. Moskowitz was one of the founders of the Institute of Scrap Iron and Steel Inc., and always has been active in its activities. He was the first secretary of the Eastern Scrap Iron association, one of the important forerunners of the national body, and which was prominent in the latter's organization. He has served as secretary of the national society since its inception.

As a trade organization official he has always been a worker. He believes in personal contact with the various chapters of the institute, and as president expects to achieve an even closer co-operation than now exists among the 13 local divisions which at the moment comprise the national Institute. Most of these he expects to visit from time to time during his tenure of office for the purpose of rendering assistance however and whenever needed.

Mr. Moskowitz was born in New York Dec. 26, 1891. After a necessarily brief education in New York public schools he entered the employ of M. Samuels & Sons Brooklyn, N. Y., Feb. 1, 1905, as office boy. He was with this organization for 24 years, having risen by Jan. 1, 1926, to be their vice president and general manager. He served in those capacities for about three years, leaving on Jan. 1, 1929, to become vice president of the Schiavone-Bonomo Corp.

H. T. BENNETT, assistant manager of sales at Chicago for American Sheet & Tin Plate Co., Pittsburgh, became manager of sales there on May 1 to succeed W. H. Eaton, retired from that office on pension as noted, in STEEL of April 30.

A. P. Bronson, identified with the Chicago warehouse of Merchant & Co. been appointed assistant manager of sales there, to succeed Mr. Bennett.

Mr. Bennett's first identification with steel was in 1886 as a clerk in the Chicago warehouse of Merchant & Co., Philadelphia. He next became identified with Ledwidge Co., Chicago, which continued in a similar business for about five years. He then became bookkeeper and cashier for the Falcon interests, which operated a warehouse carrying sheets and tin and terne plate. After about five years the Falcon Tin Plate Co. was merged into American Tin Plate Co., and shortly after, the Falcon Iron & Nail Co. was absorbed by American Sheet Steel Co. Mr. Bennett was identified with the Chicago office of American Sheet Steel Co. and continued when that interest was merged into American Sheet & Tin Plate Co. He was made assistant manager of sales at Chicago in 1909.

Mr. Bronson was with Washington Tin Plate Co., Washington, Pa., when American Tin Plate Co. was formed, and when the Washington plant was dismantled he became affiliated with the Cambridge, O., plant of American Sheet & Tin Plate Co. He later was in the special agent's department at Pittsburgh and about 20 years ago became identified with the Chicago office. Originally he handled claim matters but shortly was transferred to the sales department, where he since has served.

□ □ □

George M. Laughlin III has been elected a director of the Jones & Laughlin Steel Corp., Pittsburgh..

□ □ □

J. H. Morris was elected secretary and assistant treasurer of Inland Steel Co., Chicago, at the recent annual meeting of stockholders. W. B. Truesdale, former secretary-treasurer, remains treasurer.

John Scott has resigned as assistant production manager of the Inland Steel Co., at Milwaukee, to take charge of the new warehouse of Moise Steel Co., Milwaukee, jobber of steel

plates, sheets, shapes, etc. He was connected with the Inland company's sheet mills for six years.

□ □ □

Myron H. Clark has been elected vice president in charge of operations of Reading Iron Co., Reading, Pa.

□ □ □

J. J. Trapp, General Motors building, Detroit, has been added to the Detroit district staff of Billings & Spencer Co., Hartford, Conn.

□ □ □

A. W. Carlisle retired May 1 as treasurer of Illinois Steel Co., Chicago. He has seen 41 years of service.

□ □ □

A. M. Lally, Pittsburgh district manager of sales for National Tube Co., retired under United States Steel Corp.'s pension plan, has been succeeded by R. R. Jardine.

□ □ □

Walter Siegerist has become general manager of Skinner Bros. Mfg. Co. Inc., St. Louis, manufacturer of heating, ventilating, drying and blow pipe apparatus.

□ □ □

Jacques L. Vauclain has resigned as vice president and works manager of the Baldwin Locomotive Works, Philadelphia, because of ill health. He is a son of Samuel Vauclain, Baldwin chairman.

□ □ □

George V. Lang, auditor and assistant treasurer of United Engineering & Foundry Co., Pittsburgh, has been elected to the additional office of secretary. He succeeds the late George H. Friesel, who also was treasurer of the company.

□ □ □

Alvah H. Warren Jr., formerly assistant manager of sales at St. Paul for Illinois Steel Co., Chicago, has been appointed manager of sales there to succeed W. J. Totten, whose retirement in harmony with United States Steel Corp.'s new retirement and pension plan was noted in STEEL of April 30.

□ □ □

William L. Hartley, 5938 Linsdale avenue, Detroit, has been appointed Detroit district sales manager for Link-Belt Co., Chicago. Since 1928 he has been in charge of foundry sales division of the company. Identified with Link-Belt since 1915, he started in the engineering department and later worked in the contract, standard and estimating departments. From 1917 to 1919 he was with the United States expeditionary forces in France, rejoining Link-Belt after his return from service. In 1926 he was promoted to the general sales department and the next year was transferred to the Kansas City office. In 1928 he was given charge of foundry sales.

□ □ □

G. T. Snyder, chief engineer of National Tube Co., Lorain, O., has been

(*Concluded on Page* 86)

Obituaries

WILLIAM L. BRYANT, 56, president of Bryant Chucking Grinder Co., Springfield, Vt., died April 25. Born in Northfield, Vt., he was graduated from Black River academy, Ludlow, Vt., and was a member of the 1898 closs of the University of Vermont. After college he became associated with Jones & Lamson Machine Co., rising to be chief engineer. In 1909 he resigned to organize the Bryant Chucking Grinder Co. He had many contributions to the machine tool industry to his credit, including the suspended wheel slide control applied to various types of semi-automatic and automatic grinding machinery. He was a member of the American Society of Automotive Engineers. He was a director of the First National bank, Springfield and of the Associated Industries of Vermont.

□ □ □

David Peter Johnston, 65, president of the Western Screw Mfg. Co., Chicago, died April 20.

□ □ □

Grant H. Crennell, 44, superintendent of Columbia Steel & Shafting Co., Carnegie, Pa., died April 24 at Crafton, Pa.

□ □ □

Charles M. Holbrook, 73, for many years purchasing agent of National Transit Pump & Machine Co., Oil City, Pa., died April 28.

□ □ □

Fred R. Mott, 69, Virginia, Minn., general superintendent of the Oliver Iron Mining Co. in the Virginia-Eveleth, Minn., district, died April 18.

□ □ □

Wilbur S. McIntyre, 64, founder and president of Welland Iron & Brass Co., Welland, Ont., died recently.

□ □ □

William T. Norton, 51, designer of the wartime army Liberty truck and since 1923 a consulting automotive engineer in Cleveland, died there recently.

□ □ □

Daniel S. Hoover, 64, vice president of Clark Car Co., Pittsburgh, died May 1 from carbon monoxide poisoning in his garage at Ridgway, Pa.

□ □ □

E. N. Blinn, 58, manager of the transfer department, United States Steel Corp., New York, died at Maplewood, N. J., April 30. He had been connected with the Steel corporation and its subsidiaries for 43 years.

□ □ □

Charles W. Greening, identified with Toledo Machine & Tool Co., Toledo, O., more than 30 years, died April 29. For the greater part of that period he served as secretary and treasurer.

□ □ □

Frank Burns, 86, retired armor worker and one time superintendent of the old Parrott Gun Works which produced cannon for the Union forces during the Civil war, died April 30 at Cold Spring, N. Y.

□ □ □

Charles Isaacson, 57, one of the founders of the Milwaukee Flush Valve Co., Milwaukee, died April 25. He was born in Bangor, Me. Before he retired sveral months ago because of failing in health, Mr. Isaacson had been treasurer of the company.

□ □ □

Paul Hackendahl, 83, one of the founders of Hackendahl & Schmidt Co., Milwaukee, structural steel and iron works, died April 26. Born in Germany he came to America in 1856. He served throughout the Civil war. Since he retired 15 years ago, his only son, William Hackendahl, has been president and manager.

□ □ □

Earl H. Browning, 53, vice president of Ohio Gear Co., Cleveland, died May 2. He was born in Dayton, Ind., and was graduated from Purdue university in 1897. Locating in Cleveland he was co-founder with the late B. F. Miles and Victor R. Browning of Browning Engineering Co., Cleveland, now known as Victor R. Browning & Co. Inc.

□ □ □

George F. Baker, 91, New York, financier, banker, philanthropist, a director and largest stockholder of the United States Steel Corp., died May 2. Mr. Baker was generally considered to be the outstanding figure in American banking. He was an associate of the late J. Pierpont Morgan and held directorships in many important corporations.

Labor Turnover in March on Favorable Side

Washington—The accession rate for labor turnover in March was greater than separation rate, in 75 industries employing approximately 1,250,000 persons, according to the bureau of labor statistics. The highest accession rate, 7.76 for 100 on payroll, was shown by the automotive industry, and the lowest, 2.03, by the iron and steel industry. The lowest quit rate, 0.71, and the lowest discharge rate, 0.12, occurred in the iron and steel industry.

MIRRORS of MOTORDOM

DETROIT

CONSIDERING the times, the automotive situation is measurably strong. April has just turned in a total production of more than 300,000 units—the fifth consecutive monthly increase—despite curtailment by Ford from a 4 to a 3-day week in the final ten days of the month.

From present indications, May will be a better month than April for the industry as a whole excluding Ford. Chevrolet, after expanding from 79,603 units in March to 106,096 in April, has scheduled 125,000 for May. It appears that variations among other makers—again excepting Ford—will cancel out.

Thus, Ford is the key to the situation. May's showing probably will turn upon the ability of Chevrolet, forging ahead, to wash out the indicated decline in Ford output. There is a good deal of opinion in Detroit that this will result, and that May production will approximate April's.

Not only is Chevrolet registering encouraging gains but Buick, Chrysler, Hudson-Essex, Hupp, Reo and Olds are comparatively strong. Opinions are colored by connections with those manufacturers operating at a good gait, but many in Detroit look for a reasonably good automotive situation well into the summer.

Ford Change Is Logical

Notwithstanding denials by Henry and Edsel Ford, the Ford situation patently is not a happy one. Because of the magnitude of the Ford enterprise and the necessity of maintaining dealer morale, official advance information concerning changes obviously is withheld. Consequently, in Detroit Ford denials are understandable and usually are appraised as perfunctory. Out of a welter of fact and rumor the following succinctly describes the Ford position at this time:

Ford releases for many materials have been curtailed. The working week in most departments at Detroit plants has been reduced from 4 days to 3. Even operating only 3 days a week, the Ford rolling mills have accumulated a large stock of billets and bars. Ford is selling practically no scrap in the open market; is consuming in his open-hearth furnaces lighter grades not used when heavy grades are available.

Chevrolet Increasing Lead

For some time Model A has been encountering increased sales resistance. In the week ended April 25 Chevrolet output passed Ford's and since then the gap has widened. In almost half the states Chevrolet registrations are now exceeding Ford. Chevrolet has taken from Ford a good share of the market which is swung by "smartness"—a market which is unstable and open to capture by the newest, snappiest line.

Ford engineers are credited with having a new four, a six and an eight-cylinder motor ready to turn over to the production department. It is logical to expect Ford to pass by the six-cylinder field because Chevrolet has capitalized it so strongly; it is logical to expect a revised four as the bottom of the line, and an eight.

A new four could be put in production relatively easily. The body would have its prototype in the present de luxe line, with its slanting windshield. The new four motor is reputed to be more powerful than the present one.

Majority opinion is that the eight will be of the V-type, priced at $850 to $1200, in many respects a small edition of the Lincoln. Outwardly there is nothing in the way of retooling to indicate that actual production on the eight is under way, although the foundry department at Fordson is understood now to be operating 7 days a week, building up a supply of the new motors.

When the changeover was made from Model T to Model A in 1927, Ford was out of production from March to December. At present there are moderately large stocks of Model A parts at various assembly plants, and it would be possible to continue operations at these branch plants as a screen while the new models were being put in production at Detroit. Hence the basis for the expectation of an extensive shutdown at Detroit, possibly beginning June 1.

Free-wheeling transmissions are expected to be factory equipment of both the new four and the eight. It is possible, too, that the occasion of model changes might afford a propitious moment for abandoning f.o.b. Detroit as the price-basing method and substituting the delivered price so long under consideration at Fordson.

Ford output for April is given as 117,891 units, but since this includes foreign assemblies a domestic comparison is not possible.

Chevrolet, as previously noted, stepped up its April schedule three times, finally producing over 106,000 units—crossing 100,000 for the first time in a year—and has expanded its material releases for 125,000 units this month. The switch to syncro-mesh transmission is expected July 1, an offset to Ford's proposed free-wheeling. Chevrolet plants are operating no less than 5 days a week, some 6 days, and with considerable night work.

Chrysler Revising Eight

Chrysler will shortly announce modifications in its eight-cylinder line—some of the innovations already being incorporated, including a more powerful motor. In a general way, the revised Chrysler six has taken over the appearance of the eight, and the eight will now resemble the Imperial, with a V-type windshield and more chromium plating.

As a group, the Chrysler lines are in heavier production and this appears to

be a good Chrysler year. Plymouth output is down a trifle. Chrysler proper is assembling about 2500 weekly, Dodge 2800, DeSoto 1200 and Plymouth 1350. Chrysler as a group made 31,000 units in April, setting the pace for May.

Packard is the subject of much discussion. Important changes are on the way, but there is some opinion for believing they will be less radical than expected a short time ago. It was then expected that in its large eight Packard would break with its traditional design and do something startling—for it. Syncro-mesh transmission will be a feature on the new line. Packard production is about 80 a day, 5 days a week, showing a lag behind other large-car manufacturers.

Reo is operating better, at about 50 units a day, 5 days. Reo will shortly have a light truck in the market, to compete with Ford and Chevrolet, and probably will offer a lower-priced car also, powered by this new six-cylinder motor. Reo's April shipments were 1023, a drop of about 200 from March.

Low-Price Six for Graham

Graham also is to market a new six-cylinder car, being the "Prosperity Six" so much talked about. Graham is assembling about 125 units a day, 5 days, with an increase to 180 scheduled.

Buick's April output was 13,400 units, against 10,500 in March and 9000 last April. Its weekly rate continues about 3100.

Hupp's April shipments of 3139 cars compare with 2361 in March and 3248 in April, 1930. Its May output will probably show a further gain.

Oakland-Pontiac has scheduled 12,000 units for May, unchanged from April, with a slight easiness in demand for Oakland and a slight gain for Pontiac.

Olds output in April was 7574, against 7024 in March, and the daily rate of 375 units, 5 days a week is being maintained. Other operating rates, practically unchanged from a fortnight ago, are: Studebaker, 300 a day, 5 days; Willys-Overland, 600 a day, 5 days; Cadillac-LaSalle, 130 a day, 5 days; DeVaux-Hall, 4600 scheduled for May; Auburn, 1750 weekly; Hudson-Essex, 500 a day, 4 days.

Auburn is announcing a new sedan this week.

(Mirrors of Motordom will again appear next week.)

Ford Must Pay Duty

Washington—No longer may the Ford Motor Co. ship cast iron and aluminum automobile castings from Detroit to its Canadian branch at Walkerville, Ont., for machining and profiling and return them to the United States duty free. The court of custom appeals has held that hereafter Ford must pay 20 per cent duty on iron and 40 per cent on aluminum castings thus returned to the States.

Here and There in Industry

GRINDLE FUEL EQUIPMENT CO., a subsidiary of the Whiting Corp., Harvey, Ill., has bought from Bethlehem Steel Co., Bethlehem, Pa., exclusive manufacturing and selling rights to the Bethlehem pulverizer formerly manufactured by the Bethlehem Steel Co. The Whiting Corp. manufactures pulverizing equipment, power house and industrial cranes, foundry equipment, railroad shop specialties, chemical equipment and mechanical stokers. Other subsidiaries are the Swenson Evaporator Co. and Joseph Harrington Co.

□ □ □

Improved Mfg. Co. is the new name for Improved Steel Gas Engine Head Co., Tulsa, Okla.

□ □ □

Hillman Coal & Coke Co., Pittsburgh, has moved its New York office from the Whitehall building to 120 Broadway, Room 3113.

□ □ □

David Lupton's Sons Co., Philadelphia, manufacturer of steel window products, has moved its Detroit office to 5-130 General Motors building. W. R. King is in charge.

□ □ □

Sour Lake Machine & Supply Co., Sour Lake, Tex., has moved its general offices to Kilgore, Tex., where it recently completed a shop building. John R. Everett is general manager.

□ □ □

Houston Car Wheel & Machine Co., Houston, Tex., has changed its name to Houston Foundry & Machine Co. A. J. Binz is president, and W. A. Raymond vice president and general manager.

□ □ □

Theodore L. Dodd & Co., 80 East Jackson boulevard, Chicago, have been appointed sales representatives for Ilinois for the Modern Machine Works Inc., Milwaukee, manufacturer of motor transmissions and crank shafts.

□ □ □

Roller-Smith Co., 233 Broadway, N. Y., has appointed the Commercial Engineering Co., 1800 E street N. W., Washington, its agent in the district of Columbia. The office will handle the entire line of indicating and graphic measuring instruments, circuit breakers and panels.

□ □ □

Neenah Foundry Co., Neenah, Wis., has been incorporated without change of name and with capital stock of 1000 common shares with a par value of $100. The incorporators are Edmund J. Aylward, James P. Keating and Eunice B. Aylward. The business was established many years ago by the late W. J. Aylward.

□ □ □

Shrader Electric Co., Los Angeles, manufacturer of arc welders, has appointed Tractor-Truck Equipment Co., Tulsa, Okla., its distributor east of the Rocky mountains. The latter company has also been made distributor in Oklahoma for the compressor division, Chicago Pneumatic Tool Co., New York.

□ □ □

Alan Wood Steel Co., Conshohocken, Pa., is installing in its Schuylkill iron works department a new continuous oil-burning slab-heating furnace for feeding its 56-inch 3-high mill engaged in the production of blue annealed sheets. The new continuous furnace makes it possible to eliminate three hand-heating furnaces.

□ □ □

Tallman Brass & Metal Ltd., Hamilton, Ont., has been completely reorganized under the receivership of G. T. Clarkson, with great increase in efficiency of operation. The Doehler die casting process is used in that department and under the new arrangement its capacity has been increased. Washing machine and automobile manufacturers in Canada are large customers for this class of work. Other products are metal stampings, spinnings, brass and bronze castings and solid and cored bars.

□ □ □

Headquarters of the Corcoran-Brown Lamp Co. formed by merger of the Thomas J. Corcoran Lamp Co., Cincinnati, the John W. Brown Mfg. Co., Columbus, O., and the Indiana Lamp Corp., Connersville, Ind., will be in Cincinnati.

□ □ □

Welding Engineering & Research Corp., 25 West Forty-third street, New York, has announced the appointment of Ancel St. John as a member of its technical board. Dr. St. John is president of the St. John X-ray Service Corp., 505 Fifth avenue, New York, and the recent appointment brings these two organizations into close association, although each will continue to maintain its individual identity. The Welding Engineering &

(*Concluded on Page* 93)

EDITORIAL

Foreign Trade Well Held On Quantity Basis

COMPARISON of foreign trade figures of the United States for 1930 with those of 1929 and the five-year average of 1925-1929 presents a much better picture when quantities are compared instead of values. This results from the lower level of prices in the later year. Thus the 1930 export trade was 27 per cent in value but 19 per cent in quantity below that of 1929 and 23 per cent in value and only 12 per cent in quantity below the five-year average. Imports were 30 per cent in value and 15 per cent in quantity below 1929 and 28 per cent in value and 3 per cent in quantity below the five-year average.

The foreign commerce department of the Chamber of Commerce of the United States has interpreted figures of the bureau of foreign and domestic commerce of the department of commerce and has found much of encouragement.

A conclusion is that the foreign trade of the United States has neither disintegrated nor been irreparably impaired in the present trade crisis. Many lines, including steel and iron, have been hard hit, but stubborn resistance on the part of exporters and importers to the forces of business recession has had results.

Figures show a number of instances of well-sustained trade and reveal also the extent to which price declines, rather than slackening of export and import movements, have contributed to trade recession as measured in values. The importance of quantity figures is emphasized at this time to aid in identifying the extent to which overseas trade in individual commodities has been affected.

Some "All-Time" Records Yielded By 1930 Statistics

Comparison with the five-year average is also important in showing the relation of 1930 trade, that the long-term trend may be measured against the sharp contrasts of 1930 with 1929. While "all-time" records were not expected in 1930 trade, the figures reveal a considerable number, principally in foodstuffs and clothing materials. Radios, electric fans and electric batteries were among the lines establishing new quantity records in exports. More gasoline was exported and more imported than in any previous year.

While the total foreign trade of the United States was 28 per cent smaller in 1930 than in 1929 and 25 per cent below the average of the five years, measured in values, and is the lowest since 1915, yet it was only a little below the total for 1921 or 1922, years when prices were much higher, showing that the physical volume of foreign trade in 1930 was greater than in the postwar years of trade recession.

Steel and Iron Decline Sharply; Machinery Volume Grows

Steel and iron mill products declined in value 31 per cent in 1930 from the 1929 figures and 9 per cent from the five-year average. Structural steel exports were 34 per cent smaller in volume and 20 per cent less in value than in 1929. Exports of bars and rods sustained the heaviest loss, 78 per cent in quantity and 46 per cent in value below 1929 and 71 per cent in quantity and 33 per cent in value from the five-year average.

Machinery exports make the best showing in the steel and iron group. Total machinery exports for 1930 declined 15 per cent in value from 1929. Industrial machinery exports also were 15 per cent below the 1929 value but were 1 per cent above the five-year average. Exports of power-driven metal-working machinery were 6 per cent higher in 1930 than in 1929 and 57 per cent above the five-year average. Construction and conveying machinery increased 30 per cent, oil-well machinery 38 per cent, mining and quarrying 12 per cent and cash registers 12 per cent, above the five-year average. Electrical machinery gained 13 per cent over the average, radio devices 89 per cent, electric transformers 57 per cent and electric batteries and motors 4 per cent.

Study of these figures shows that the 1930 decline from the average trend line is small and had 1929 not presented its unusual series of record volumes 1930 would have been considered only a slight setback from the normal progression. In spite of this factor, which is present also in the five-year average, to the detriment of comparison with 1930, volume of finished goods in exports has shown it is only slightly below the mark which the trend line would have indicated. Raw materials have not made as good a showing in exports.

Those interested in foreign trade can take much comfort in these figures, as indicative of the United States' ability to hold a good position in the world's markets even in a period marked by such extreme depression in all countries.

THE BUSINESS TREND

1931

Mar.	$7,190,877
Feb.	6,155,548
Jan.	6,118,411

1930

Dec.	4,190,958
Nov.	7,949,384
Oct.	10,943,449

1930

Mar.	$18,103,628
Feb.	16,107,410
Jan.	15,404,359

1929

Dec.	16,014,467
Nov.	18,367,105
Oct.	22,066,325

Business, Moving Sidewise, Is Holding Its Own

DURING the past 10 days business has been called upon to digest a superabundance of unpalatable news. A fare consisting of earnings reports such as the majority of those announced recently is not conducive to cheerfulness. Yet the shock to business sentiment has not been pronounced—possibly because in well-informed circles it was known long in advance that only meager profits could be expected.

Therefore, with only the erratic gyrations of the stock market to reflect the low state to which industrial profits have sunk, the business world is plodding along—working harder than ever to make progress, despite uncertain conditions.

Figures for April, when they become available, probably will present more favorable aspects than have been expected. Pig iron production, as shown in detail elsewhere in this issue, was maintained in April at a higher rate than in March, thereby establishing a gain for the fourth consecutive month. The monthly record of steel ingot output should show that average operations in April were not more than 3 or 4 points below the average of 54.74 per cent of capacity recorded in March.

Freight Volume in April Rises To Highest Point in 1931

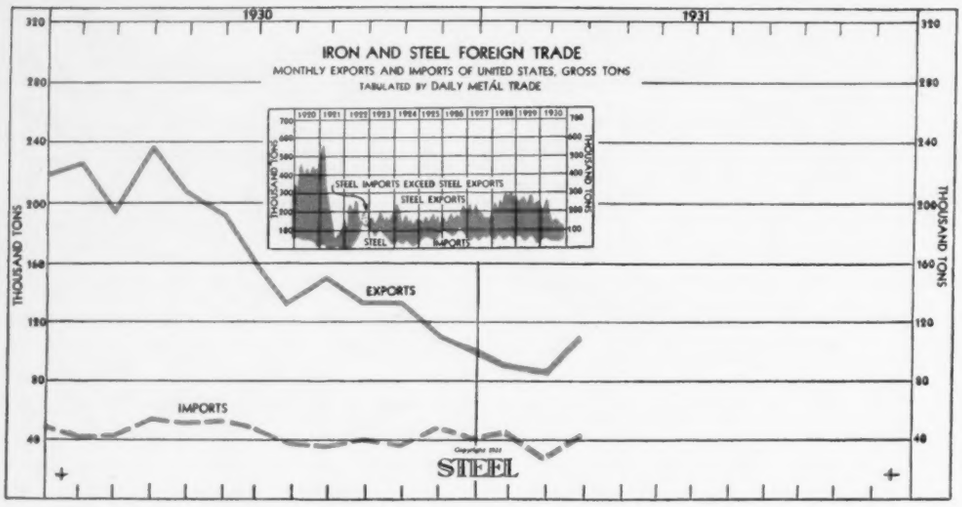
The gain in freight traffic in the week ending April 18 brought the average for three weeks in April to a point slightly higher than the weekly average of March. Revenue freight loadings of 760,002 cars during the week ending April 18 constitute the best week in freight volume since the middle of December last year.

Among the final arrivals of statistics for March are four in which moderate gains were shown. Imports and exports were up slightly, as was the volume of foreign trade in iron and steel. Orders for steel castings showed a small increase and awards for fabricated structural steel in March were the largest in five months. In all cases, however, the levels for March were far below those of the third month last year.

Auto Output and Building Awards Are Receding from Recent Levels

Just what is in store for the automotive industry is a question of some importance at this time. Chevrolet increased its schedule last week but the Ford output was lowered, resulting in a slight decline in the totals for the entire industry. The spurt in building activity which occurred in March seems to have subsided. Car awards in April were only a third of the March total.

The price situation has not changed materially. Thus far there is no sign of renewed resistance to the fresh impetus for decline which developed a month ago. Irving Fisher's commodity price index has dipped again for the fifth consecutive week. STEEL's composite of 14 steel and iron products, which averaged $31.66 in March and $31.59 in April, was down to $31.49 on April 29. The decline in April definitely destroyed any lingering hope that February might prove to be the low point of the present price slump. At the moment, the trend is downward, with no signs of an immediate change.



Exports

	Tons
March, 1931	109,512
Feb., 1931	91,212
March, 1930	238,329

Imports

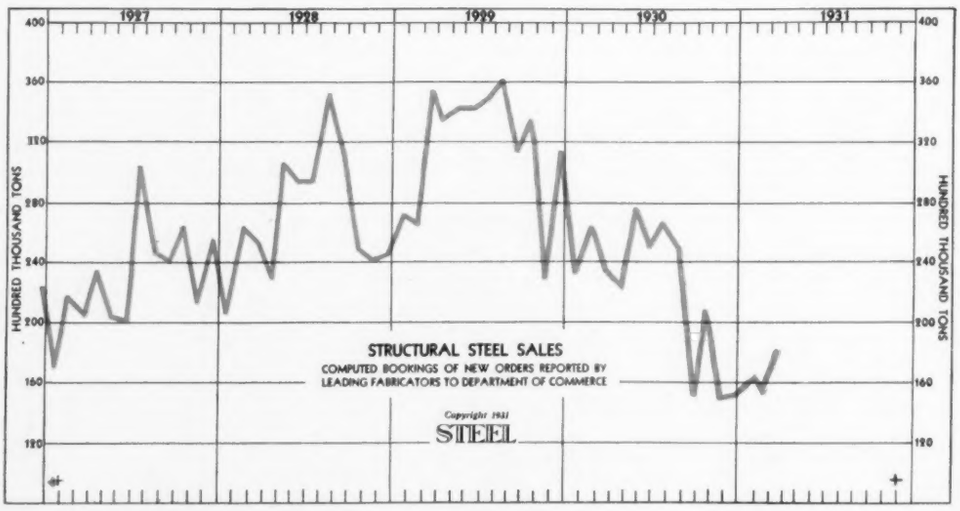
March, 1931	40,401
Feb., 1931	28,045
March, 1930	56,618

Iron and Steel Foreign Trade Turns Upward in March

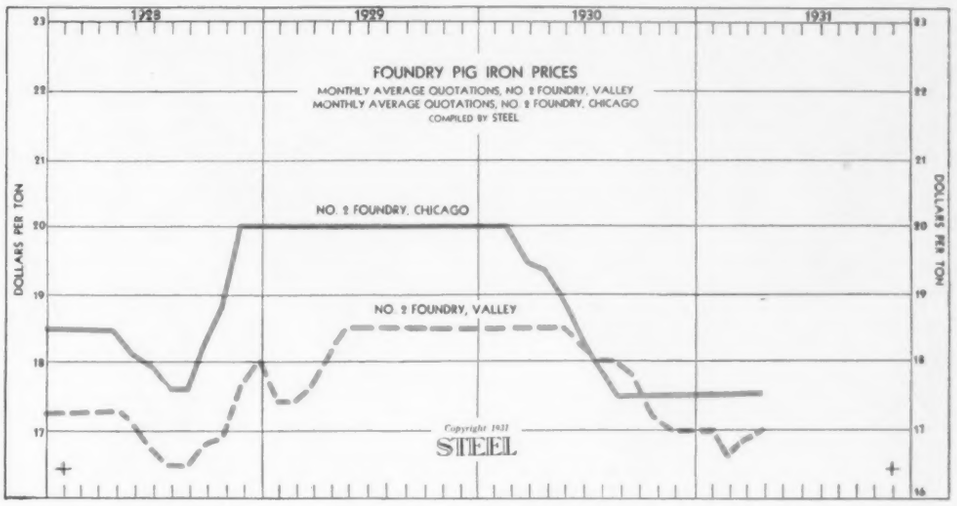
Foreign trade in iron and steel products recovered in March a portion of the volume which had been lacking during the last few months. Exports, amounting to 109,512 tons, were the best since last November, when the most recent decline set in. They were above the February total by 18,300 tons, but the gain was a very small step toward a more normal level, as shown by comparison with March, 1930, when 238,329 tons were shipped out. Imports, which in the month before had dropped to a very low point, moved back upward to 40,041 tons, at approximately the rate of last December and January, but under that of March last year at which time 56,618 tons entered the country.

Structural Steel Bookings Make Gain, But Still Are Subnormal

Fabricators reported a substantial increase in structural steel orders for March, tonnage gaining from 158,800 tons to 185,600 tons. However, no March on record witnessed a smaller total of bookings. While the expansion is more or less seasonal, it is to be noted that in 1927, 1928 and 1930 March orders showed decreases, dropping in 1930 from 267,600 tons to 236,800 tons. Two years ago an unusually large rise from 250,635 to 334,565 tons took place in the third month. March sales were the best since October, 1930, when they expanded temporarily to 209,200 tons. Shipments were off further to 152,800 tons, from 166,800 tons in February and 264,800 tons a year ago.



	Tons	
	1931	**1930**
March	185,600	236,800
February	158,800	267,600
January	162,400	238,800
	1930	**1929**
December	152,800	297,605
November	151,200	212,136



Monthly Averages

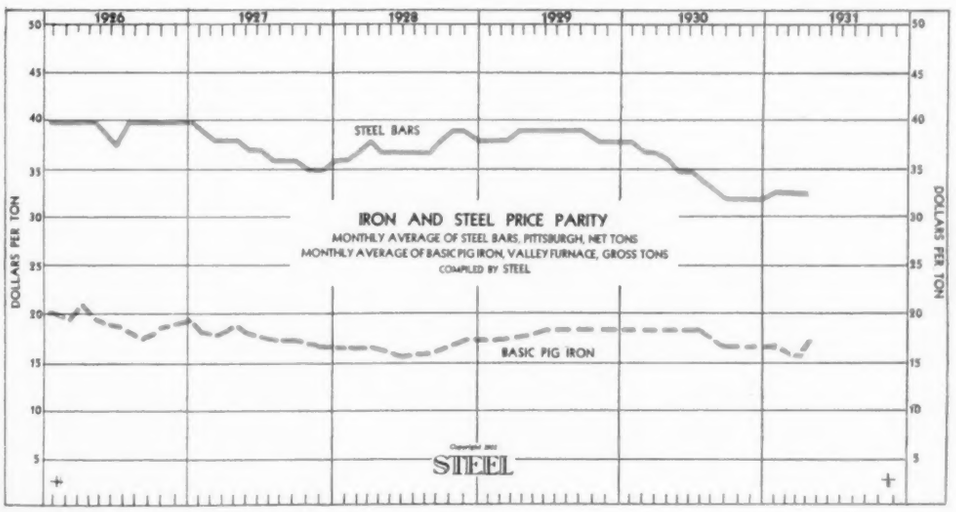
	No. 2 Foundry Chicago	Valley
April, 1931	$17.50	$17.00
March, 1931..	17.50	16.90
Feb., 1931.....	17.50	16.75
Jan., 1931.....	17.50	17.00
Dec., 1930.....	17.50	17.00
Nov., 1930.....	17.50	17.00

Chicago Foundry Pig Iron Remains Steady for Ninth Successive Month

While No. 2 foundry pig iron, Chicago, remained steady at $17.50 during the month of April, valley quotations made an average for the month of $17, compared with $16.90 in March. Valley quotations have been unchanged since early in March, when they were turning upward from the $16.75 level of February. The Chicago price has been stabilized at $17.50, April being the ninth consecutive month at that average. A year ago, the second step was marked in the sharp downward drop of No. 2 foundry at Chicago. The first break from $20 was in March, to $19.50, and the second in April, to $19.40. The valley quotation a year ago was steady at $18.50.

Monthly Average for Valley Pig Iron Moves Up Slightly to $17

Steel bars, Pittsburgh, for the fourth time were at a monthly average of $33, while the April average of basic pig iron, valley furnace, was brought up to $17, compared with $16.75 in March. With continued buying just to fill immediate requirements, the valley pig iron quotation still is largely nominal. The steel bar price, along with other quotations for finished materials, has become more firmly established, but there is little evidence that the announced $34 rate for spot tonnages is being enforced, although some finished items are reported at that figure for small lots. Steel bars now are only $3 under a year ago, and basic pig iron, valley furnace, $1.50.

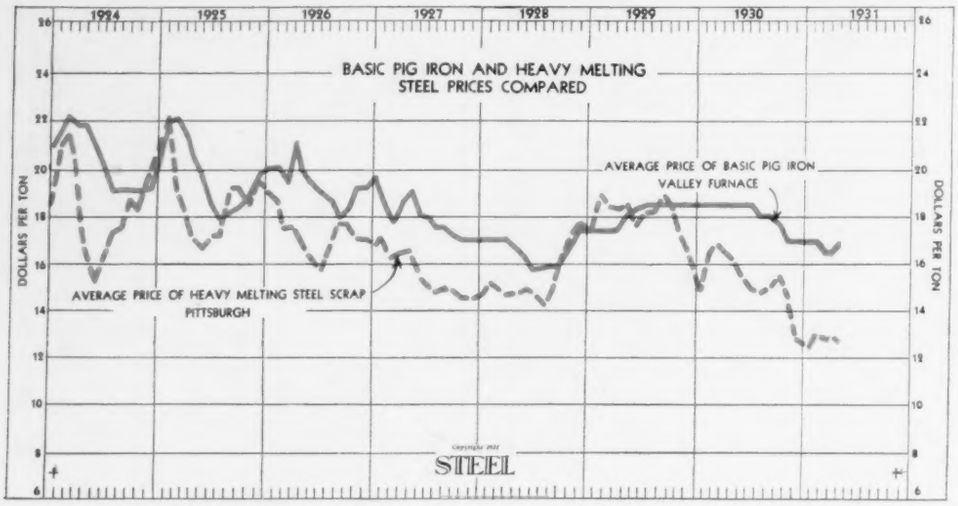


Steel Bars

	1931	1930
April	$33.00	$36.00
March	33.00	37.00
Feb.	33.00	37.00
Jan.	33.00	38.00
	1930	**1929**
Dec.	32.00	38.00

Basic Pig Iron

	1931	1930
April	$17.00	$18.50
March	16.75	18.50
Feb.	16.75	18.50
Jan.	17.00	18.50
	1930	**1929**
Dec.	17.00	18.50



Basic Pig Iron

	1931	1930
April	$17.00	$18.50
March	16.75	18.50
Feb.	16.75	18.50
Jan.	17.00	18.00

Heavy Melting Steel

	1931	1930
April	$12.50	$16.05
March	12.90	16.60
Feb.	12.75	16.90
Jan.	13.00	16.55

Heavy Melting Steel Drops to New Low Average in April

Softening of prices in the scrap market during the past month brought heavy melting steel, Pittsburgh, to a new low average for the month, at $12.50. Meanwhile basic pig iron, valley furnace, was gaining from an average of $16.75 to $17, on a quiet market. Mounting stocks and little buying brought scrap prices to a critical point in the latter part of April and most of the leading grades suffered cuts. The spread between pig iron and scrap is now unusually wide, augmented by the April changes. In April, 1930, pig iron was stabilized at $18.50, but heavy melting steel, at $16.05, was on the second of three successive declines. Two years ago heavy melting steel prices topped pig iron prices.

Miscellaneous Group Helps Castings Orders To Stage Recovery

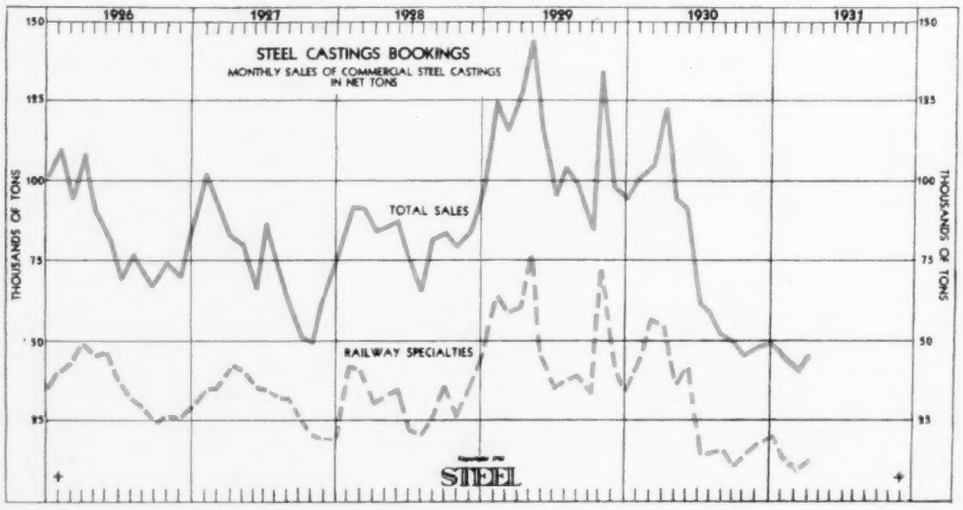
Total orders for commercial steel castings in March almost made up the ground lost in February. Sales amounted to 46,638 tons, or 32 per cent of capacity. Statistics for the first quarter show that orders for 133,740 tons were not far above a single month's orders in the 1930 period, when 338,462 tons were booked. Two years ago first quarter orders were for 370,778 tons. March orders for railway specialties gained from 9136 tons to 10,612 tons, the principal rise being in miscellaneous castings, which in rising from 31,156 to 36,026 tons, more than made up their February drop. Production, as in February, ran ahead of bookings in both classifications and in the total, 54,714 tons.

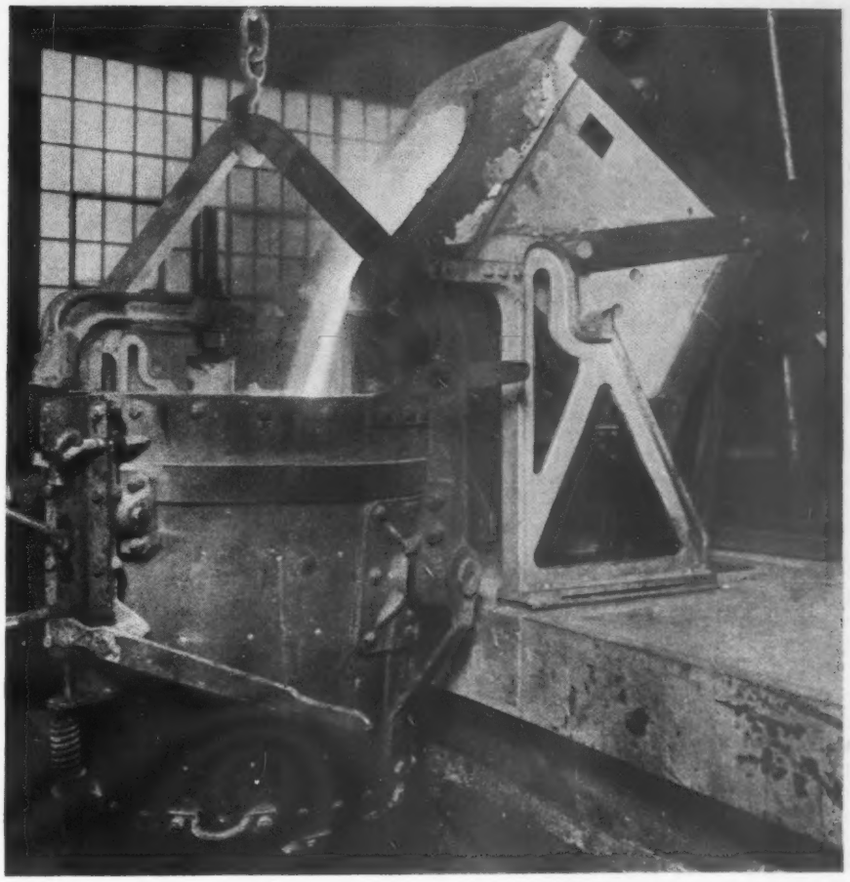
Total New Bookings

	Tons
March, 1931	46,638
February, 1931	40,292
March, 1930	122,462

Railway Specialties

	Tons
March, 1931	10,612
February, 1931	9,136
March, 1930	54,063





TAPPING steel from a high-frequency induction furnace into an oversize ladle. The latter holds the melt of two or more furnaces and affords the production of ingots up to 13 inches square weighing 3700 pounds. The metal is bottom poured into molds.

High-Frequency Induction Furnace Affords Heat Uniformity

BY H. C. BIGGE
Bethlehem Steel Co., Bethlehem, Pa.

IMPROVED performance has become an absolute necessity to modern industry and has demanded new developments in the manufacture of tool steel. The complex fields of present-day industrial activity have called for the discovery and perfection of many highly specialized types of tool steel. In order to supply this steel on a production basis, there have been marked improvements in manufacturing facilities.

Prominent among these improved facilities is the high-frequency coreless induction furnace which was invented in 1916 by Dr. E. F. Northrup. For the first few years, the principle was applied only to smaller furnaces, which found a wide field of usefulness among research laboratories, universities and nonferrous metal industries. These furnaces received their power from an electrical system made up of a mercury arc, condenser and inductance of suitable capacities, properly tuned.

About 1925, sufficiently large and efficient high-frequency generators and satisfactory condensers became available for larger units, making possible the first production of tool steel by this process in October, 1927. Within the last two years, the use of the high-frequency coreless induction furnaces all over the world has increased rapidly, resulting in installations representing a total of 25,000 kilowatts, including laboratory furnaces which are now in operation for the melting of sterling silver, nickel silver, magnetic alloys and tool steels.

In 1929, the Bethlehem Steel Co., Bethlehem, Pa., installed the largest high-frequency core-

less induction melting equipment in the United States for the manufacture of special tool steel and other special alloys. This equipment consists of two 300-kilowatt generators and four furnaces, two of 1200 pounds capacity each, and two of 650 pounds. In addition to these units, the research laboratory equipment includes a unit of 14 pounds capacity. This equipment may be viewed as a substantial refinement of the old crucible process, made possible by the utilization of electrical energy. The temperatures obtainable are far in excess of present-day steelmaking requirements.

An induction furnace is a transformer in which a primary circuit is supplied with power at constant voltage and constant frequency, and a short circuited secondary circuit is formed by a charge of metal in a refractory crucible. The output of this transformer is heat which is developed by currents induced in the secondary circuit.

The term "core-type" induction furnace designates an induction furnace which has an iron core to form the magnetic circuit. Correspondingly the term "coreless" is applied to the type of induction furnace which has no iron interlinking the circuits. The latter type in elementary form consists only of a container, or crucible, a primary coil and a supporting structure.

In the core-type furnace there is a large magnetic flux and slow change in that flux, that is, a low frequency. The magnetic flux of a coreless induction furnace is small and the change in that flux is rapid. Hence, the term "high frequency" generally is used in referring to that type of furnace.

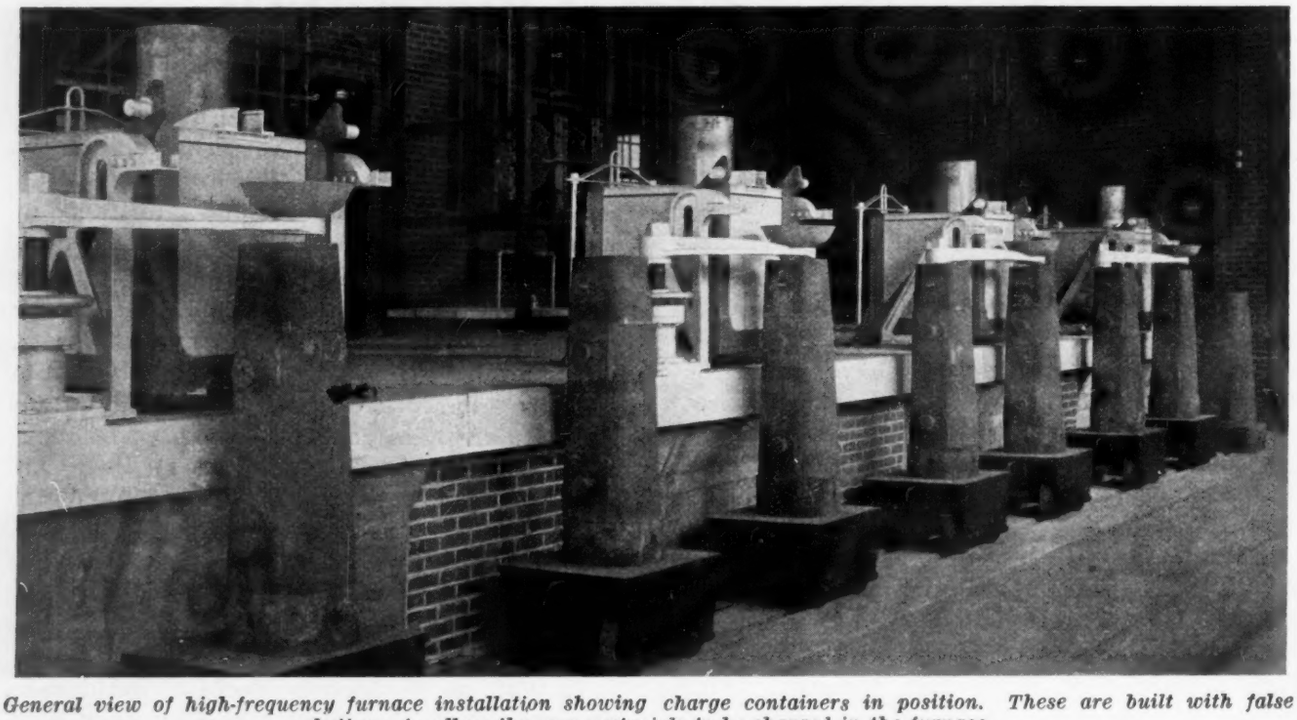
DEVELOPMENT of high-frequency generators and more efficient condensers has permitted the construction of electric coreless induction furnaces of larger capacity. The use of this type furnace and details of its operation, as explained by H. C. Bigge at a recent meeting of the Boston chapter of the American Society for Steel Treating, are included in the accompanying article. The author is superintendent, tool steel department, Bethlehem Steel Co., Bethlehem, Pa.

The alternating magnetic flux developed by the current in the primary coil penetrates the charge of metal in the crucible and currents thereby are induced in the metal. If the material to be heated is not an electrical conductor, the crucible must be made of a conducting material such as graphite, to serve as a secondary circuit of the transformer.

The advantage of this type furnace compared with the crucible, or with furnaces necessary for the commercial production of large tonnages, is the remarkable uniformity of heat throughout the charge. When the high-frequency current is passed through the coil of the furnace, a magnetic field is set up which is of the same frequency as that of the current. Since the induced currents in the charge are dependent upon the rate of change of the magnetic flux, currents of high value may be induced in the charge. The high frequency generated in the charge causes rapid heating, the rate of which can be regulated by the rate at which energy is supplied to the furnace. Of course, the actual limitation of the rate of heating is in the design of the furnace itself, including the size of the copper conductor which makes up the coil, the conductors which form the leads to the furnace, and the current carrying capacity of all the other electrical apparatus serving the furnace.

The high temperatures employed, the close proximity of the copper coil to the vessel containing the charge, and the energy losses in the coil itself, make it important to provide an adequate cooling system. For this reason, the coil of the furnace is made of copper tubing, and water, or some other coolant, is circulated through the coil to keep the temperature within safe limits.

In the Bethlehem installation, each furnace is operated from a separate control panel, on which is mounted an indicating watt meter and power factor meter, a suitable oil switch for connecting the furnace to the 800-volt single-phase high-frequency bus, various switches for



General view of high-frequency furnace installation showing charge containers in position. These are built with false bottoms to allow the raw materials to be charged in the furnace

connecting the proper number of condensers across the terminals of the furnace coils, and four switches for selecting the desired number of turns in the furnace coils. This panel is mounted directly back of the furnace in order that the connections between the furnace and its oil switch, and the oil switch and the high-frequency bus may be as short as possible.

The energy required by these furnaces is supplied by two 300-kilowatt single-phase generators running at 1470 revolutions per minute, 980 cycles per second, 800 volts and rated 468 amperes at 0.9 power factor. Each generator is driven by a 2-pole, 500 horsepower, 3-phase 25 cycle, 6600 volt, squirrel-cage induction motor. The generators operate in parallel and supply energy to the 800-volt, 980-cycle bus previously mentioned.

Capacity Fully Utilized

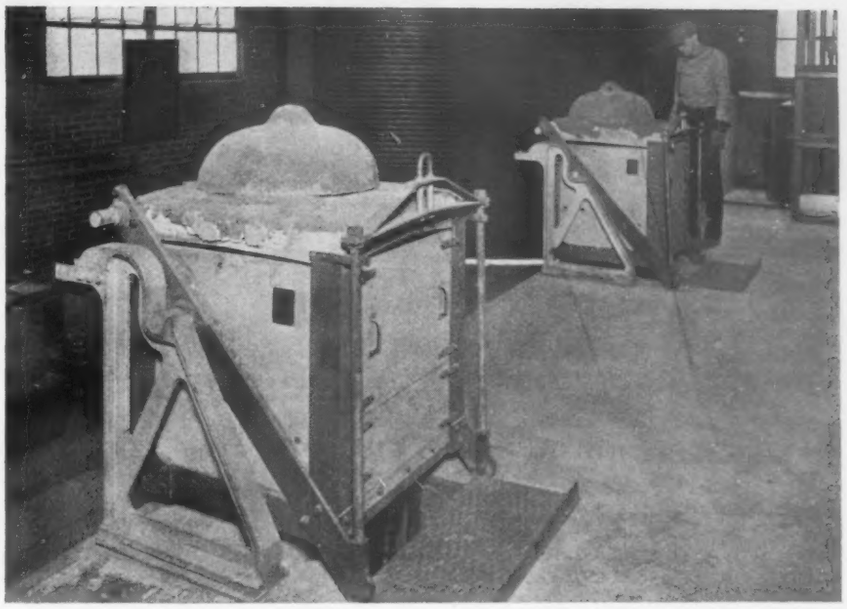
The furnace takes maximum energy when the minimum number of turns are connected across the 800-volt bus and minimum energy when maximum turns are so connected. To obtain maximum production, the input to the furnaces should be maximum during the melting period and the input reduced to the desired amount while refining. In operating the four furnaces full advantage of these points is taken to obtain maximum production from the entire equipment; for example, two furnaces may be melting at 200 kilowatts each and two refining at 100 kilowatts each, making a total of 600 kilowatts.

Condensers of suitable capacity are connected across the terminals of the coil, making the power factor of the current taken by the combination of the furnace coil and the condensers substantially unity. By this arrangement, the current in the coil is many times the current in the leads to the generator.

The lining of the furnace may be acid, basic or neutral and can be made by ramming the refractory in over an asbestos sleeve and slowly sintering it with a wash heat, or a crucible may be used. In the Bethlehem furnaces, crucibles of a special bonded magnesia refractory are used. The space between the crucible and the inductor coil is rammed-in electrically with sintered magnesia. Typical analyses of the crucible and backing material follow:

Element	Per cent in crucible	Per cent in backing
Magnesia	82.48	89.59
Silica	10.12	5.46
Iron oxide	1.02	0.57
Calcium oxide	2.88	2.05
Alumina	3.50	2.33

At present an average of 100 heats per crucible is being realized. The maximum number of heats per crucible is dependent upon several factors, such as the nature of the charge, chemical composition of the melt, temperature of the metal, violence and duration of the stirring and finally the care which is used in the preparation of the crucible.



Two furnaces in operation showing covers which protect bath from atmospheric oxidation. Mirror on sidewall permits crane operator to see spout of furnace during tapping

At Bethlehem coreless induction furnaces are being employed for the melting of high-speed steels; high-grade tool steels; and, heat and chemical resisting products, which require pouring temperatures from 2800 to 3100 degrees Fahr., such as cobalt high-speed steel, tungsten high-speed steel, tungsten steels, heat-resisting alloys, chemical-resisting alloys, and, special composition tool and magnet steels.

The base metals employed are dependent upon the quality and composition of the finished product. Typical analyses follow:

	Grades of Iron			
Element	Electro-lytic	Muck bar	Open hearth	Char-coal
Carbon	0.005	0.050	0.020	0.040
Mangan.	none	0.050	0.020	0.080
Phos.	none	0.012	0.015	0.030
Sulphur	0.006	0.018	0.020	0.030
Silicon	none	0.030	0.010	0.030
Copper	0.006	0.025	0.040	0.050
Iron	99.983	99.812	99.875	99.790

For high-speed steel, scrap of known analysis is accumulated from the various operations supplemented by purchased scrap which invariably is remelted in a basic-arc electric furnace, cast into small ingots, identified according to composition and stocked for use in making up part of the charge for the induction furnace. This procedure is necessary, since all materials used must be of known analysis to accurately control the product. It is essential that all the items of the charge, including the alloys used, be of the highest quality.

After the necessary calculations have been made, the charge is weighed and placed in the furnace as the melting progresses, in the following order: High-speed steel scrap, flux, deoxidizers, muck bar, ferro-tungsten and alloys. The following shows the estimated analyses of the material charged and analyses of the product for making a heat of high-speed steel:

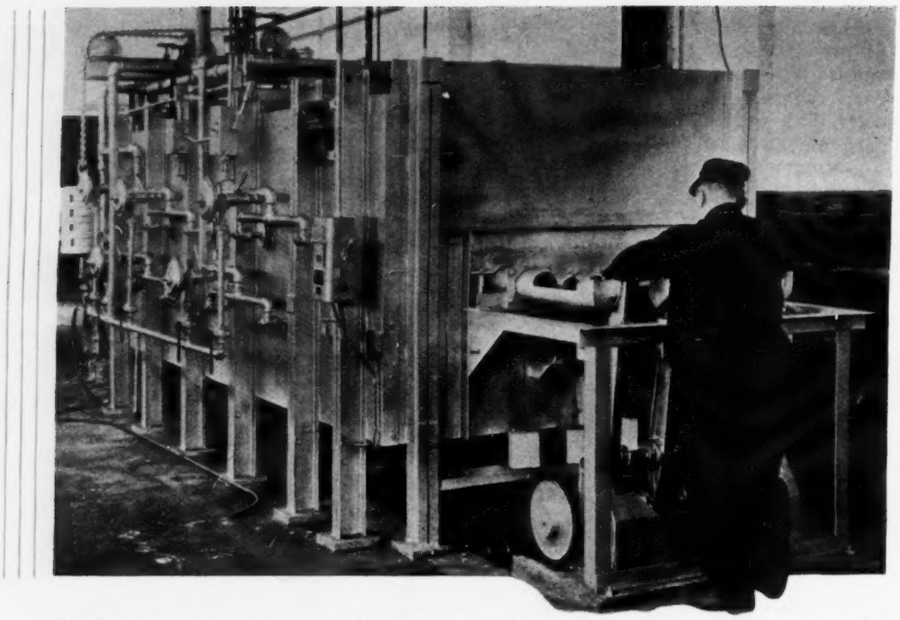
Element	Est. analysis of charge, %	Final analysis of ingot, %	Loss, %
Carbon	0.82	0.72	0.10
Manganese..	0.40	0.30	0.10
Phosphorus	0.20	.....	.....
Sulphur	0.21	.....	.....
Silicon	0.45	0.30	0.15
Chromium ..	4.20	4.15	0.05
Tungsten	18.50	18.40	0.10
Vanadium ..	1.10	1.05	0.05

Small Alloy Loss

In the foregoing case, there is no appreciable loss of chromium, tungsten and vanadium. Excess carbon, manganese, silicon and other alloys are added in the charge for deoxidizers. The regulation of the carbon content is not so simple; and, therefore, the quantity of deoxidizing agents to be added with the charge or after the base metal is molten, must be estimated carefully, dependent upon the carbon content and upon the ultimate analyses of metal desired.

The difficulty in regulating the carbon when melting in a magnesia crucible, is attributed to a number of factors, the most important of which are the time of melting, the oxides on base metal and scrap, and the time of adding deoxidizers. The materials charged into the crucible have a certain amount of oxide in the

(*Concluded on Page 57*)



Hardening furnace, fired with butane, in plant of large automobile accessories manufacturer

Butane, New Industrial Gas, Shipped as Liquid

BY GEORGE R. BENZ
Philfuels Co., Detroit

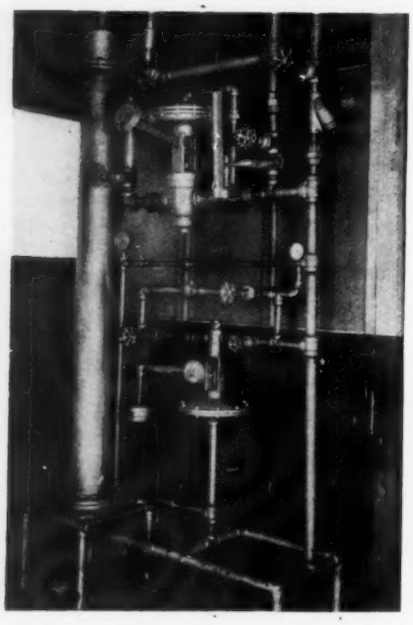
BUTANE, although well known to the natural gasoline industry for years, has not been used prior to 1927 in its commercial form as an industrial heating medium. However, economic changes in the natural gasoline industry have made it possible to distribute butane as a fuel gas, the first applications being made in the plant of a prominent automobile manufacturer, where early in 1927 the gas was used for firing continuous heat treating furnaces.

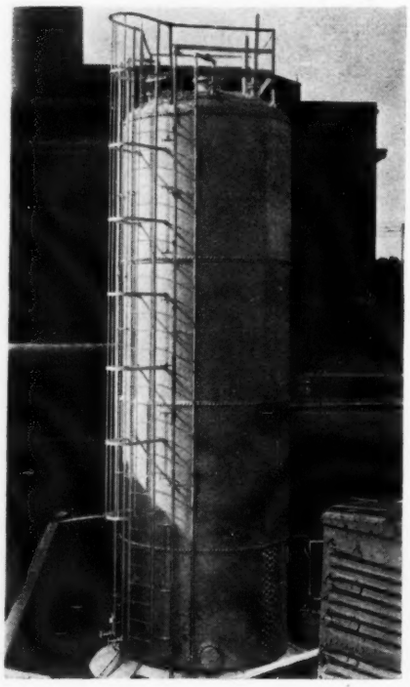
The fourth member of the paraffin series of hydrocarbons, butane, in nature is associated with other paraffin hydrocarbons, the most well known being methane (CH_4) and ethane (C_2H_6), which are the principal constituents of natural gas. The third member, propane (C_3H_8), is used widely under various trade names as a liquefied gas or "bottled gas" for domestic cooking and hot water heating.

Butane and associated gases come from the wells as vapors, in which form they are piped to the rectification plant where they are liquefied and separated by the proper applications of pressure and temperature. The butane is then held in plant storage tanks as a liquid awaiting shipment to users.

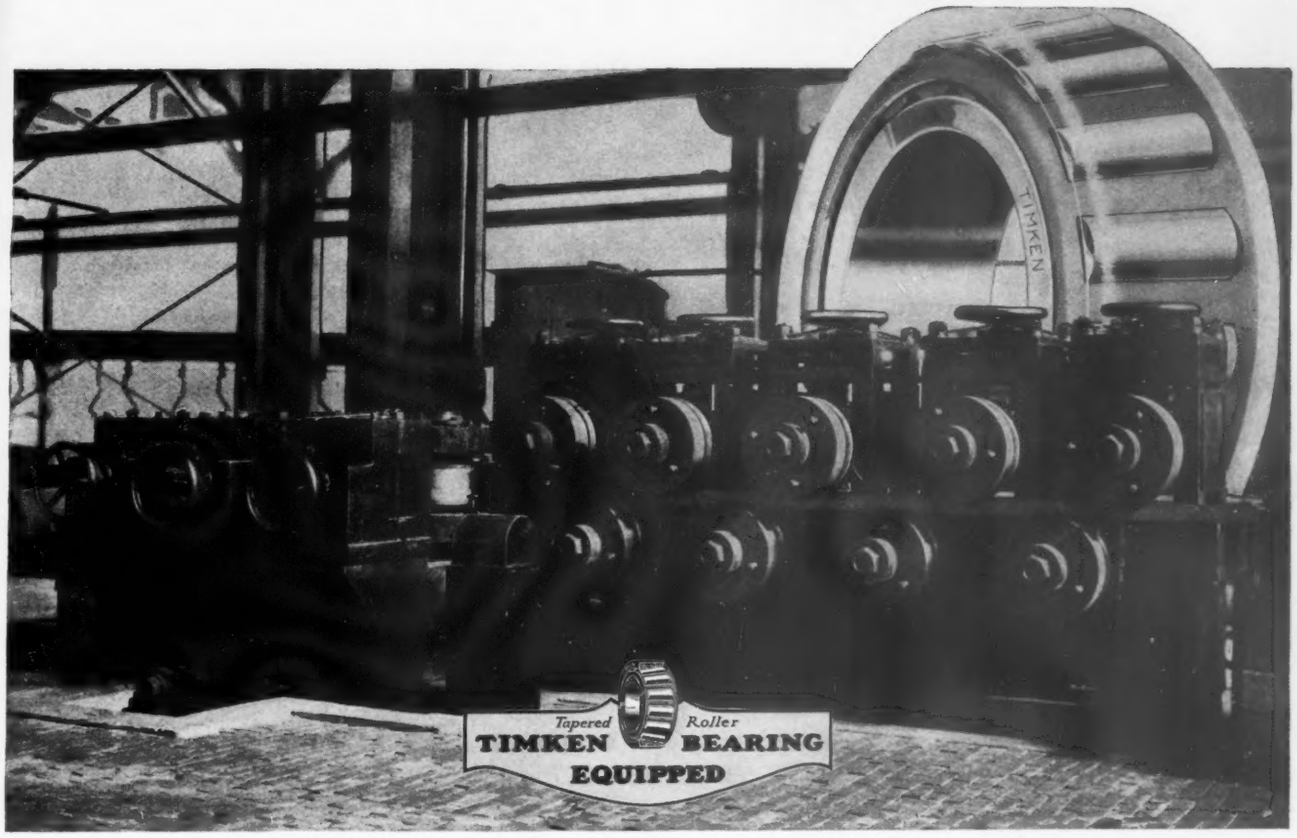
Butane is a colorless, odorless liquid, free from sediment or water, with liquid and gaseous properties as shown in Table II. Special tank cars, I. C. C. class 104-A, are used for the transportation of butane. These cars have a carrying capacity of approximately 10,000 gallons or an equivalent in thermal value to about 2,000,000 cubic feet of 537 B.t.u. gas.

Car loads of butane are unloaded at the user's plant into suitable storage





(Left)—Vaporizing mechanism which supplies low-pressure butane gas to heat treating furnaces. (Right)—Liquid butane is stored in this vertical tank erected at a large automobile plant

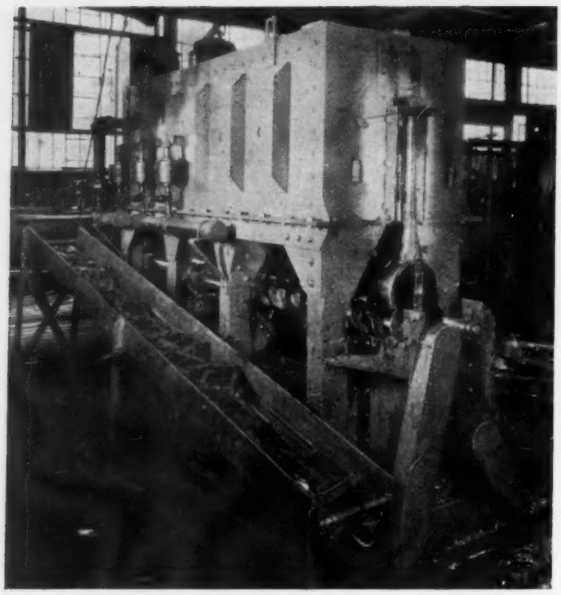


Timken has 102 Bearings on the Sutton No. 5 Two-way Flat and Shape Straightener

This machine is Timken-equipped throughout, every important shaft and roll being Timken mounted to assure permanent alignment and full protection against friction, radial, thrust and combined loads.

Capacity: Rails up to 90 pounds, angles up to 6″x6″x 1 ″, flats up to 6″x1″. Speed 250-350 feet per minute. The Timken Roller Bearing Company, Canton, Ohio.

TIMKEN *Tapered Roller* **BEARINGS**



SPECIAL high-temperature heating furnace, butane fired, with screw conveyor for handling automobile rear axle housings

tanks, as shown in an accompanying illustration, where the liquid fuel is held until required in the plant. Unloading is generally accomplished by pressure differential, no pumping or heating being necessary. At times, the vapor pressure is made use of to assist in unloading cars. Due to its low viscosity the gas flows readily even in the most severe cold weather, without any form of preliminary heating.

Before butane can be burned most satisfactorily, it should be vaporized or allowed to return to its original vapor state. As generally practiced, vaporization consists of (1) liquid pressure reduction and resultant expansion through a suitable reducing regulator; (2) supplying the small amount of heat for vaporizing in a small heat exchanger, using hot water, exhaust steam, hot oil, steam or similar mediums; and (3) pressure control on gas discharged from vaporizer, usually at low pressure, into plant piping, through a suitable gas governor.

Butane gas usually is piped around a plant at low pressure and in its undiluted form or 3200 B.t.u. per cubic feet. Distributing a high B.t.u. gas reduces the size of piping required to carry a definite amount of thermal value, when compared to a gas of low B.t.u. value. For certain uses and for special cases butane sometimes is mixed partially or diluted with air or inert gases prior to distribution. Since it is odorless, a stench is added as a means of readily detecting any small gas leaks which might develop in the pipe system or at the burners.

Combustion characteristics are similar to those of natural gas, furnace and burner equipment suitable for natural gas being satisfactory, with the necessary adjustments for the type of combustion desired. For theoretically perfect combustion, an air-gas ratio of 31-1 is required.

In Table I below is a comparison of butane and other common industrial gases.

The fuel is used for many industrial heating processes, the principal

Table I

Composition and Combustion Characteristics of Fuel Gases

Constituents of gases shown, per cent by volume	† N-Butane	* Bituminous producer gas	* Oil gas "Protero 1920"	* Coke oven gas	* Natural gas Oil City, Pa.	* Carburetted blue water gas	* Blue water gas
CO	.....	27.0	6.8	6.3	.....	33.4	42.8
CO_2	.....	4.5	1.0	1.8	.....	3.9	3.0
H_2	.....	14.0	59.2	53.0	.....	34.6	49.9
N_2	.....	50.9	2.7	3.4	1.10	7.9	3.3
O_2	.....	0.6	0.1	0.2	.....	0.9	0.5
CH_4	.....	3.0	25.4	31.6	67.60	10.4	0.5
C_2H_6	.....	.....	.....	.....	31.30	.....	.....
C_2H_4	.....	.....	3.8	2.7	.....	6.7	.....
C_6H_6	.....	.....	1.0	1.0	.....	2.2	.....
C_4H_{10}	100.0	.....	.....	.....	.....	.....	.....
Specific gravity (Air = 1.0)	1.95	0.86	0.35	0.42	0.71	0.65	0.53
B.t.u./cubic foot gross	3271	150	575	588	1232	536	308
B.t.u./cubic foot net	3104	140	510	521	1120	496	281
Products of combustion, cubic feet per cubic foot of gas							
CO_2	4.0	0.35	0.47	0.51	1.30	0.74	0.46
H_2O	5.0	0.19	1.21	1.25	2.29	0.75	0.51
N_2	24.586	1.49	3.91	4.13	9.26	3.54	1.82
Total (dry)	28.586	1.84	4.38	4.64	10.56	4.28	2.28
Ultimate CO_2 per cent	13.99	19.0	10.7	11.0	12.3	17.2	22.3
Net B.t.u./cubic foot of products of combustion	92.5	69.2	84.2	82.7	81.7	88.5	89.7
Flame temperature corrected for dissociation, degrees Fahr.	3735	3160	3725	3660	3620	3815	3800
Volumes required in cubic feet							
O_2	6.5	0.259	1.026	1.085	2.446	0.918	0.473
N_2	24.58	0.981	2.884	4.105	9.254	3.45	1.787
Air	31.09	1.24	4.91	5.19	11.70	4.37	2.26

*American Gas association handbook "Combustion"
†Philfuels Co.

COMPOSITION OF AIR

	By Volume	By Weight
O_2, per cent	20.91	23.11
N_2, per cent	79.09	76.39

For exacting needs

PRACTICALLY all Roebling Flat Wire is custom-made. Our shops handle thousands of flat wire orders yearly—but seldom are any two specifications alike. This is because we specialize in flat wire of highest quality, to meet the distinctive—and usually exacting—needs of each of our customers. ¶ We invite your inquiry regarding our specialized experience of over 40 years, our exceptional manufacturing facilities, and our prices. Roebling Flat Wire is made of cold rolled high or low carbon steel, in various widths, thicknesses and finishes including galvanized and tinned. ¶ We are especially well-equipped to make high carbon flats, tempered or untempered, and in any finish.

JOHN A. ROEBLING'S SONS CO., TRENTON, N. J.

WIRE • WIRE ROPE • COPPER AND INSULATED WIRES AND CABLES
WELDING WIRE • FLAT WIRE • WIRE CLOTH AND WIRE NETTING

New York Boston Chicago Philadelphia Atlanta Cleveland
San Francisco Los Angeles Seattle Portland

ROEBLING FLAT WIRE

Table II

Properties of Commercial Butane

Vapor pressure, pounds per square inch gage	
at 70 degrees Fahr.	33
at 90 degree Fahr.	53
at 100 degrees Fahr.	65
at 105 degrees Fahr.	71
at 130 degrees Fahr.	110
Temperature at which pressure is 0 pounds per square inch gage, degrees Fahr.	15
Specific gravity of liquid (Water = 1)	0.576
Initial boiling point, degrees Fahr.	12
Final boiling point, degrees Fahr.	30
Weight per gallon of liquid, pounds	4.8
Specific gravity of gas (Air = 1)	1.95
Cubic feet of gas per pound of liquid	6.7
Cubic feet of gas per gallon of liquid	32
Limits of inflammability	
Gas per cent in gas-air mixture for lower explosive limit	1.9
Gas per cent in gas-air mixture for maximum rate of flame propagation	3.6
Gas per cent in gas-air mixture for upper explosive limit	8.4
Heating value	
B.t.u. per cubic foot	3,200
B.t.u. per pound	21,500
B.t.u. per gallon	102,400
Latent heat of vaporization at boiling point	
B.t.u. per pound	170
B.t.u. per gallon	830

ones being: Annealing, hardening, drawing, normalizing, carburizing, cyaniding, metal melting, plate heating, soldering, brazing, oxybutane cutting, lithographing, tempering, forging, upsetting, smelting, enameling, japanning, drying, internal combustion engine fuel, glass melting, glass annealing, core baking and galvanizing.

Furthermore, butane, because of the similarity in combustion characteristics to natural gas, affords an ideal "standby" or auxiliary gas service, should the supply of natural gas be subject to interruption or depletion. The same gas piping and burners may be used, thus eliminating any duplication of piping or burners, which would be necessary if oil were used as a "standby." The change from natural gas to butane can be effected without delay or interruption to production schedules.

Induction Motors Conserve Power in Operation of Larry Cars

A RIDERLESS larry car system including a special method of remote control recently was placed in operation at the plant of the Trinity Portland Cement Co., Eagle Ford, Tex., and may be of interest to iron and steel executives on account of its suitability to blast furnace and steel plant transportation practice. Operation of the cars is by special electric equipment made by the General Electric Co., Schenectady, N. Y., including two 50-horsepower squirrel-cage induction motors with electric solenoid brakes. Power is collected from the track system. Two operators, located where they can view the loading and unloading of the cars and their movements, govern the principal car movements.

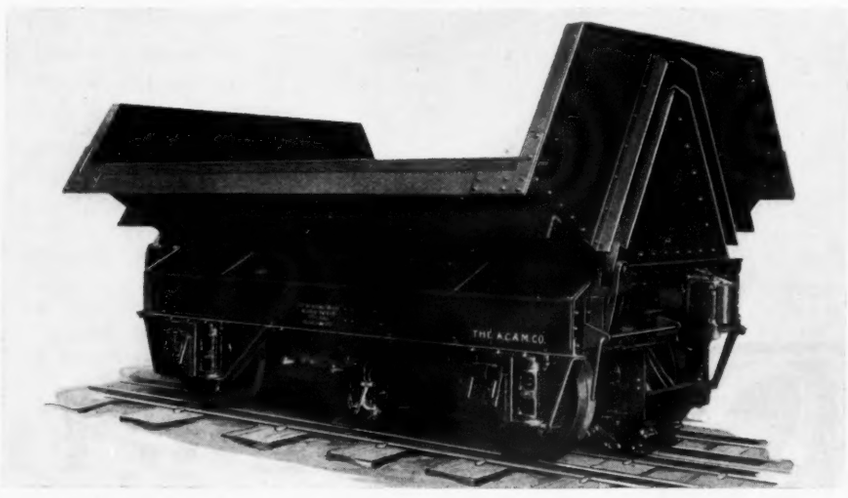
The track on which the cars run is divided into a number of sections insulated from each other, and having transformers and control cabinets. The motor-driven cars collect their energy from an extra-rail system. Switches mounted on desks in front of the two operators control the delivery of energy to each section of track. By energizing one section only, the car runs through that section to the next whereupon, the energy supply being cut off, the brakes automatically set and stop the car. Cars can be "inched" along, a short distance at a time, by applying energy to the section momentarily. Cars will not coast indefinitely on a dead track section because of the automatic action of the brakes. The direction of travel can be changed merely by throwing a switch.

Runaways Are Prevented

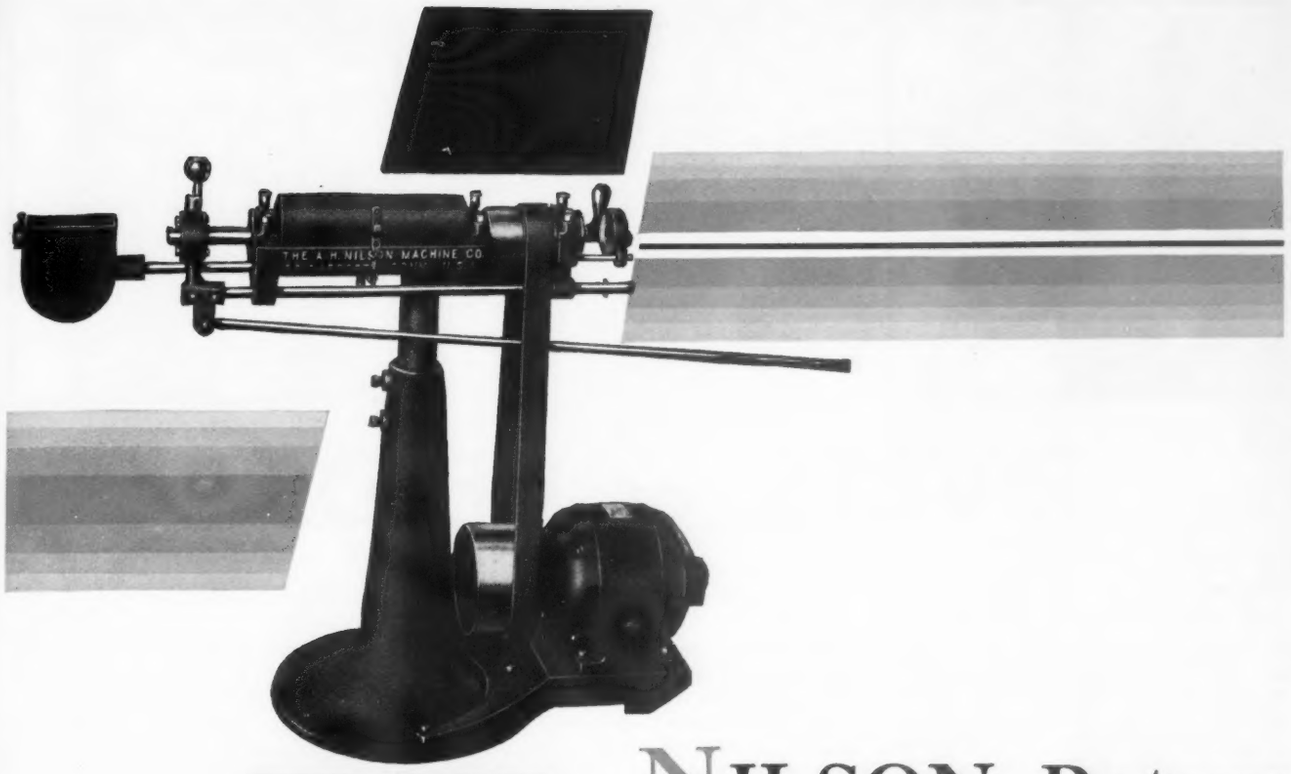
Another interesting feature of the installation is the conservation of power made possible by the use of the squirrel-cage, induction motors. An inherent characteristic of such motors is that they tend to maintain constant speed under all circumstances. On down grades gravity will not materially over-speed the cars but will be automatically converted into electricity, for the motors will then act as generators. The power thus generated will be fed back into the power system, helping to operate other cars on other sections of track.

The use of induction motors is new for such applications, direct-current motors usually being employed. The dump cars to which the electric drive is applied were built by the Atlas Car & Mfg. Co., Cleveland, and are of a special side-dumping type especially desirable for severe duty in quarry service. The hopper of the car is a separate unit connected to the frame by heavy steel hinge castings. The cars are dumped at the crusher by a special electric hoist, designed and built by the Atlas company so that there are no loose parts nor any moving mechanism on the cars to be damaged by steam shovel loading.

Details of operation of this remote-controlled haulage system and a complete description of the cars used were presented in papers before the National Industrial congress in Cleveland, April 13-17.



Side-dumping larry car, propelled by squirrel-cage induction motors



NILSON Rotary Wire Straightener

The Nilson motor-driven, rotary wire straightener gives most effective straightening. It may be easily connected to any machine and will quickly pay for itself wherever wire is being used in production. Consider its many advantages:—

Two control handles are located for greatest convenience of operator.

Oscillation of arbor is controlled with a positive rod connection to the feed arm of the forming machine, assuring absolute reliability.

Arbor travels one-half the length of feed carriage. Changing the length of feed automatically changes the oscillations.

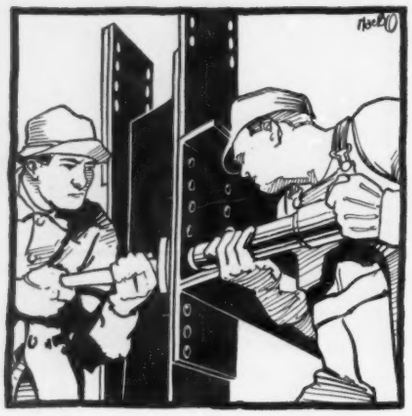
Wire can be fed and pushed through while straightener is running.

Dies have wearing surfaces on four sides.

Capacity—maximum No. 7 gauge, minimum No. 12 gauge. With an extra arbor all sizes to No. 18 gauge can be straightened on this machine. Get full specifications and details—

Send for Bulletin

The A.H. Nilson Machine Co.
Bridgeport, Conn.



BY LEE H. MILLER

Chief Engineer, American Institute of Steel Construction Inc.

RIVETS or WELDS?

BOTH riveting and welding will always constitute processes for connecting steel parts and it will be the problem of the engineer or architect to keep himself so informed that he can tell his clients with confidence where and how either rivets or welds can be used. Based upon present experience and information the writer considers it folly to claim we are now ready to abandon rivets since welds can be made to replace them, and it is as great a folly to wipe welds from our industrial processes because we lack the experience to inspect and analyze their properties.

The competent structural engineer is gifted with an instinct or sixth sense of balanced structural proportions into which is woven a background of experience and technical training that co-ordinates these three essential elements. He cannot be stampeded into a position where his sixth sense, his experience or his technical training are not satisfied. He not only checks and double checks but he triple checks and, furthermore, he does each in an established sequence.

Rivet Research Needed

Rivets have been his companions and almost his bed-fellows for the years of his experience, and the experiences of generations before him. They have been so constantly a part of all his work that much needed research on their process of functioning has not received the consideration merited. Like a broken-in shoe they almost automatically adjust themselves to meet the stresses occasioned by service.

It is one of the properties of stress to follow the line of greatest resistance or strain, and is the remarkable faculty of steel to carry a local stress beyond its yield point, where its immeasurable plastic movement brings an entire connection into service with an increased yield point due to cold working.

A properly designed group of rivets for a connection will by this process adjust themselves under a service load to an approximately uniform condition in spite of minor variations in workmanship. Consciously or unconsciously the experienced engineer reacts to this characteristic of a riveted connection and may be unwilling to abandon it for welds and his more or less limited experience in this field.

Steel structures have failed under different conditions as to cause but the writer has been unable to identify any structural failure resulting from rivets or where rivets have failed in service. Rivets, however, have failed in driving, either as a result of excessive heating in rivet manufacture or in driving. It is known that too high a temperature seriously injures the metallurgical structure of the steel and that once subjected to this high heat only by expensive treatment can the material be re-constructed.

It must be recognized that with all the years experience and use, rivets are not foolproof. Furthermore, research has not been as extensive and data have not been as widely distributed as the rivet's importance merits. In fact, it has been stated that in the last five years more research has been pursued and more data published on welding than has been the case with rivets in the last 50 years or more.

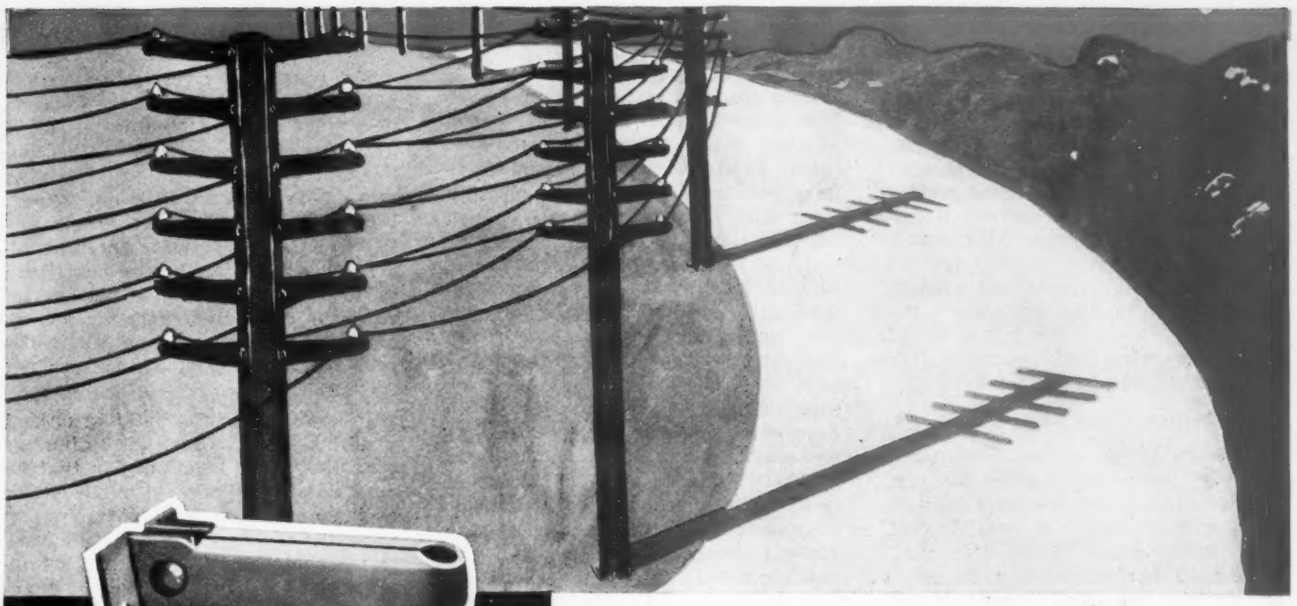
Opportunity for Welding

With as broad a background of experience on welds as the engineer has on rivets he would find many places where economy and safety are satisfied by welding. It is simple with satisfactory existing methods to assume a "show me" attitude toward welds, believing that when the other fellow has developed his experience it can be acquired and put on with no more delay than changing a pair of shoes. This unfortunately is not true. There are many places of secondary nature, however, where welds can be used and experience acquired without involving the primary parts of the structure.

In the case of steel plate floors, for instance, which do not involve the main frame, opportunity is afforded to use many times the amount of welding that the main frame would require. The problems of welding a structural frame differ from those involved in welding smaller units where by careful research it is possible to establish procedure and sequence for exactly duplicated conditions, and produce satisfactory results. In a structural frame the various connections are not duplicated and are related to each other in a manner that as yet is difficult to control.

Electric arc welding involves condi-

DIFFERENCE of opinion may exist as to whether structural steel shall be joined by riveting or welding, but fair-minded authorities see legitimate and growing use for both processes. In the accompanying article, Lee H. Miller, chief engineer, American Institute of Steel Construction Inc., Cleveland, presents the structural engineer's viewpoint in the matter. This article constitutes an address which Mr. Miller made before a conference of building officials in Toronto on April 23.



CROSBY

SHEET METAL STAMPINGS

Sheet Metal Stampings have been our product—exclusively—for thirty-five years. From the bicycle to the airplane, and all the products in between, we have worked with the manufacturer—developing his new parts, redesigning his old forgings and castings into lighter, stronger, and less costly stampings.

The advantages of this long and diversified experience are manifold. Surely you can benefit by them. Tell us about your requirements.

THE CROSBY COMPANY

General Offices and Works: Buffalo, N. Y.

BRANCH OFFICES

Chicago Detroit Cleveland New York Philadelphia

1896
35 YEARS IN BUSINESS
1931

tions resembling foundry castings, except that the liquid metal is in much smaller units and is not poured from a ladle. It differs from the chilled casting of the foundry in that the electric arc by its action heats part of the parent metal. It permits the inexperienced or careless welder to produce a result in the metallurgical structure similar to that occurring in burned or overheated rivets. It involves cooling strains and shrinkage similar to foundry work where the patternmaker must use a special scale of measurements amounting to approximately 3/16 inch per foot.

Welders Take Rigid Tests

An examination of these conditions does not mean they cannot be met successfully just as they have been in foundry work, and it is possible that welders will attain a closer approximation to perfection than founders and in fewer years of research.

In connection with the large welded skeleton frame office building in Dallas, Tex., more than 100 supposedly competent welders tried to qualify for this work. Of this number, 22 were subjected to qualifying test, and only 10 were accepted for shop work, and half of these, or 5, for field work. This appears to be a high mortality rate, but perhaps if as rigid test were applied to riveters many would also fail. The company constructing this building acquired valuable experience under the supervision of consulting engineers representing the owners and they give assurance that under similar conditions they would be glad to do similar construction, but they have no intention of scrapping their riveting equipment.

Welding has made possible the manufacture of equipment that has been of great economic value to industries. Large pressure vessels 8 feet or more in diameter carrying pressures of more than 1000 pounds per square inch at temperatures over 1000 degrees Fahr. have been welded of steel plates from 4 to 6 inches thick. Axial seams and dished heads have been butt welded by depositing layer upon layer of arc weld metal to build up the full strength of the heavy walls of the vessels. The wall thickness of many of these vessels is beyond that in which riveting has ever been undertaken. It has been found that a single deposited line forming a fillet bead has a coarse uneven structure but as the succeeding layers are deposited there is constantly increased refinement of the metal previously deposited. This condition is particularly conspicuous in the texture of the fracture which shows the various stages in refinement of the built-up metal.

Relation of the Engineer

The relation of the engineer to rivets and welds is that of designing, inspecting and reporting to the purchaser whether the work is in accord with the conditions of the purchaser's contract. The relation of the manufacture of single unit articles is that of designing, workmanship, inspection and guaranteeing the purchaser that all is done in accordance to a specification acceptable to the purchaser.

The relation of a manufacturer or fabricator of a structure is that of providing material and workmanship in accordance with an engineering specification, and to the satisfaction of an engineer of inspection representing the purchaser. It is apparent that engineers and inspectors are going to prefer the type of connection that they best understand, and feel most competent to report to the purchaser regarding workmanship.

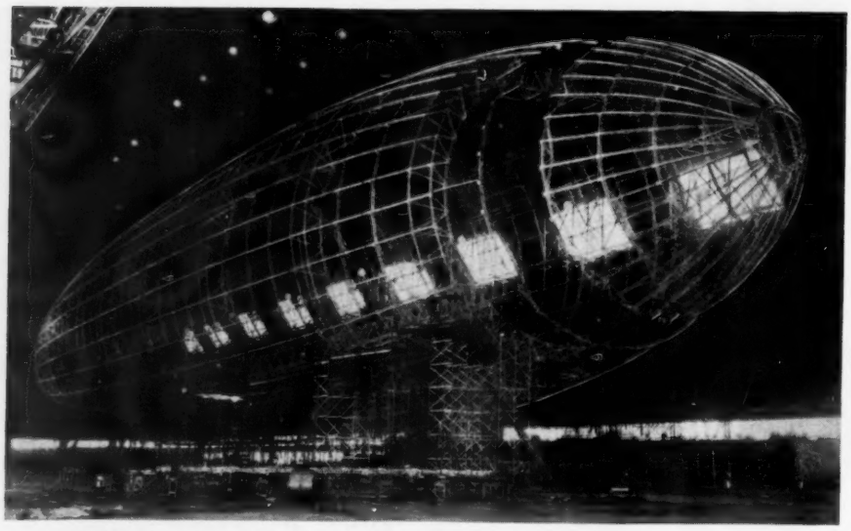
The routine of rivet inspection has a background of procedure that has met industrial and technical requirements over a long period of time and the nondestructive test or inspection of welds is relatively little understood. Until this talent is more widely distributed the conservative engineer adheres to rivets, but he can contribute to the distribution of knowledge on welds by employing them for secondary parts of the structure where the functions of the main frame are not involved.

The relation of the building official to rivets and welds is quite different from the others mentioned in that he must administer enacted public safety ordinances and participate or recommend the revisions of such ordinances to meet advancing conditions, but always remembering that he must administer the revisions. He must deal with the talented and the ignorant since both are his public. To whatever extent he varies from the written code he becomes personally involved.

Aim Is To Protect Public

It is not the function of the building commissioner to guarantee an individual that his building is constructed in accordance with a purchase contract, but it is his function to protect the public against individuals constructing buildings in violation of enacted safety codes. The commissioner is naturally opposed to codes that are impossible or difficult to enforce with the inspection forces under his direction. He hesitates to approve what the engineering profession has failed to recognize and is competent to design, supervise and inspect.

It is the opinion of the author that welds should be permitted for secondary parts of structures which do not involve the primary stresses of the skeleton frame and for primary stresses for the present when the owner assumes the responsibility for proper design, material and workmanship. To advance the welding art and insure safety such primary welded construction should be designed and supervised by a competent committee approved by the commissioner and the records of their experiences and recommendations should became available to the commissioner and the engineering profession.



FRAMEWORK OF GOODYEAR-ZEPPELIN PAINTED BY AIR BRUSH

Air painting effected a tremendous saving in time in construction of the United States navy dirigible, AKRON, *now nearing completion in the Goodyear-Zeppelin Corp. plant in Akron, O. The entire structural framework was painted by the air process, a task which by the brush method would have required weeks. The air painting equipment was furnished by the Paasche Airbrush Co., Chicago*

Analyze 1929 Coal Use

Analyzing the consumption of bituminous coal in 1929, which totaled 500,129,000 net tons, the federal bureau of mines finds the railroads consumed 131,100,000 tons or 26.2 per cent, by-product coke ovens 76,759,000 tons or 15.4 per cent, beehive ovens 10,028,000 tons or 2 per cent.

Controls Open-Hearth Reversal by Temperature Difference

BY H. R. SIMONDS
Associate Editor, STEEL

TEMPERATURE control is an important factor in the metallurgy of open-hearth steel, because of the influence of temperature on chemical reactions. Nevertheless, designers of furnaces have been slow to add automatic temperature control features. This probably is due to the great variation in conditions governing temperatures in the open-hearth furnace.

The time to add the hot metal to the charge is governed by the temperature of the materials on the hearth. Usually this temperature is as high or higher than the melting point of pig iron. Later, in the purification period, it is desirable to keep the furnace temperature higher than the bath temperature to prevent chilling the bath when ore is added and during the lime boil. During the final stages of working the heat the operations are confined to regulating the properties of the slag, adjusting the carbon content of the steel and to raising the temperature of the bath to the point where the steel may be tapped from the furnace.

Although new features have been added within the last few months, automatic reversal cannot be said to be a new or untried development, inasmuch as it has been in operation on one open-hearth for over six years, and now is used on a number of furnaces at other plants. Control equipment for a full-automatic reversal recently was designed and built by Leeds & Northrup Co., Philadelphia, in accordance with data gathered from a complete study of the problem. The success obtained in all installations seems to indicate that open-hearth furnaces will follow the lead set by blast furnaces in adopting automatic temperature control.

Applied to All Types

The regenerative system of a typical open-hearth steel furnace consists of four checker chambers, two on each end of the furnace, and of flues which connect these chambers with the stack and furnace port. The flue systems are equipped with dampers, air lids and reversing valves to control the regenerative system. The Isley-type furnace has three checker chambers on each end and the oil-fired Stevens-type furnace has but one checker chamber on each end. The principle of reversing, however, is similar in all of these cases.

In order to regenerate the heat stored up by the checker brick the flow of fuel gas and air must be reversed at regular intervals. The reversing process varies with different fuels and is comparatively simple in the case of gas fuel. In the case of tar the following operations must be performed at each reversal: (1) turn off tar valve, (2) admit steam into tar line to purge line for 10 or 15 seconds, (3) turn off purging steam, (4) turn off atomizing steam, (5) re-

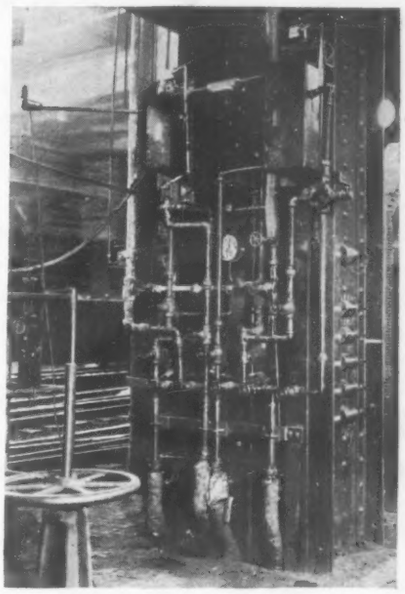


Fig. 2—Valve system and electric control devices

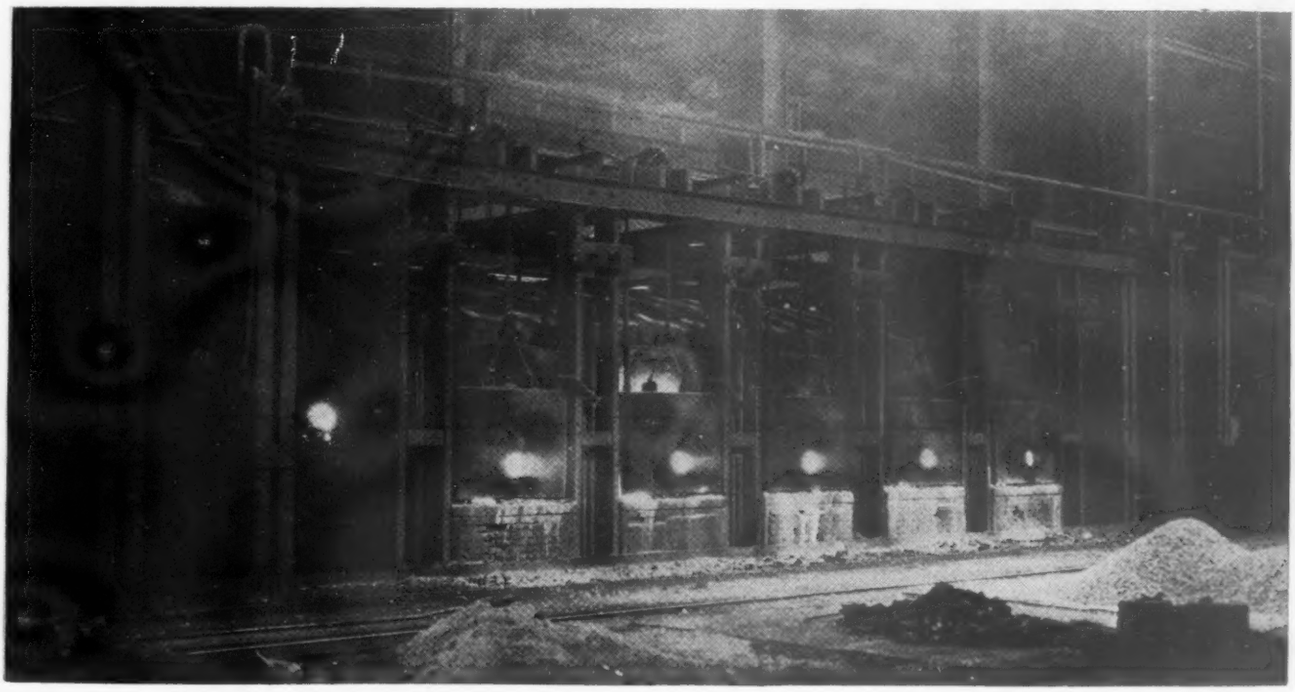


Fig. 1—Open-hearth furnace in successful commercial operation using temperature difference method of automatic reversals

—NOW see the NEW

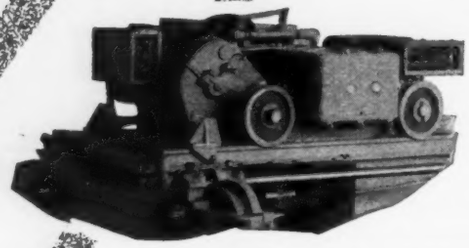
Extreme low headroom

Stronger-faster-more compact

Roller Bearings on every shaft

Load carried on STEEL throughout

Rope or push-button control



Euclid Cranes are available in models to meet every modern handling need. The rugged design of the Euclid trolley with its wide-face coarse-pitch hoisting gears and short heavy shafts, all fully enclosed and running in oil, is typical of Euclid standards of construction throughout. *Write for latest catalog.*

OLDER Euclids are known, by reputation at least, to every user of cranes and hoists.

The new Type 12 Euclid Hoists not only maintain the same reputation for dependable design, but outdo in strength, endurance and adaptability any units of similar capacity ever produced by Euclid.

Representing a new advance in hoist engineering, they include features which every user of hoists should investigate before purchasing new equipment. *You've known the old—now see the new!* Write for complete specifications and prices.

THE EUCLID CRANE & HOIST CO.
1365 Chardon Road Euclid, Ohio

CRANES
EUCLID
AND HOISTS
"Raise Profits"

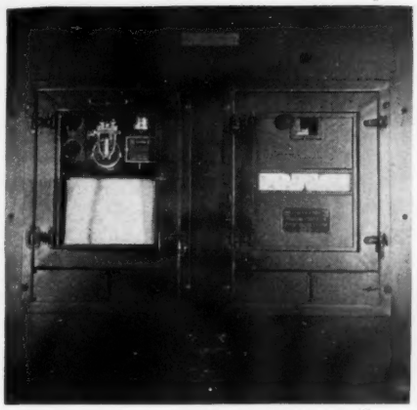


Fig. 3—Instruments to which the thermocouples are connected

verse air dampers, (6) turn on atomizing steam to tar system at opposite side and (7) open tar valve at opposite side. This whole operation requires from 20 to 40 seconds.

In studying the problem of automatically reversing an open-hearth furnace, Leeds & Northrup engineers tabulated a mass of data covering actual operating features. These data included among other things the weight and class of cold material charged, the amount of molten pig iron charged, the time required to make each heat, the amount and composition of steel produced, the amount of fuel used per heat or total B.t.u. per ton of steel and the temperatures of checker chambers and flues.

Manual methods of reversal were found to vary widely in principle as well as in results. In the usual open-hearth furnace operation the preheat cycle is controlled by having the reversal made on a time basis. The time interval between reversals varies over wide limits in different plants. The interval at present favored by most operators is 16 minutes but an exact schedule seldom is maintained because of the human element.

509 Reversals per Week

In a recent paper prepared by M. J. Bradley, engineer, Leeds & Northrup Co., and J. W. Kinnear Jr., assistant superintendent, open hearth No. 3, Carnegie Steel Co., Munhall, Pa., actual operating data for several furnaces were presented. One furnace showed 509 reversals during a week. The average time between each reversal was 10 minutes, the longest time on one set of regenerators was 70 minutes and the shortest time was 2 minutes. These investigators point out that the use of a long period and then a short period on a regenerator naturally does not give a proper distribution of heat to the regenerators. They state that while it is necessary at certain periods to have quick reversals, there is no reason why these reversals should not be of equal duration. However, as the paper points out, it is highly unsatisfactory to continue reversals on any definite time schedule. The control feature somehow must take into account the relative temperatures. For example, air leaks, unequal draft conditions, partially blocked checkers or flues may alter conditions in one system of regenerators as compared to the other system.

Comprehensive Study Made

Engineers of the Leeds & Northrup Co. studied reversals made at constant time intervals, reversals made on a high and low-temperature limit, reversals from a temperature difference in opposite cool ends of the checker chambers, reversals from a temperature difference of the checker brick surface, reversals from actual air preheat temperatures, reversals from the difference of the average of flue temperatures on each end of the furnace and other methods; and as a result of all this study the following temperature difference method was selected and developed in conjunction with J. W. Kinnear Jr. This system now is in successful operation in several plants.

The general scheme of operation is comparatively simple. Two or more thermocouples are located at corresponding points in the regenerative system, one on each end of the furnace. These are connected to a control instrument in such a way that reversals are made when the temperature difference between the two sets of thermocouples reaches a predetermined amount. It has been found that this scheme not only maintains the regenerative system in a balanced condition but will balance an unbalanced system. It accomplishes the latter by automatically and continuously changing the reversal interval on the two ends of the furnace by small increments, thus heating the cold end up to the hot end until the systems become balanced, after which the intervals may or may not be exactly the same depending upon varying conditions in the system.

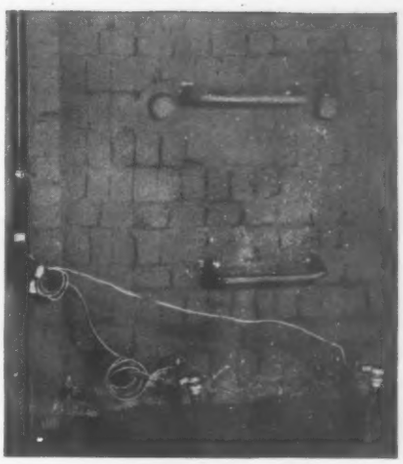


Fig. 5—Air flues in which thermocouples are located

Holds Temperature in Limits

This method of control does not prevent the temperature in the regenerative system of the furnace from going too high or too low. The regulation of the temperature over the furnace hearth is left under the control of the first helper and as this temperature should be the highest in the system, its safe control will leave little chance for the checker brick to be overheated. The scheme of reversal by difference in temperature merely holds the two control points within definite temperature limits regardless of the actual tem-

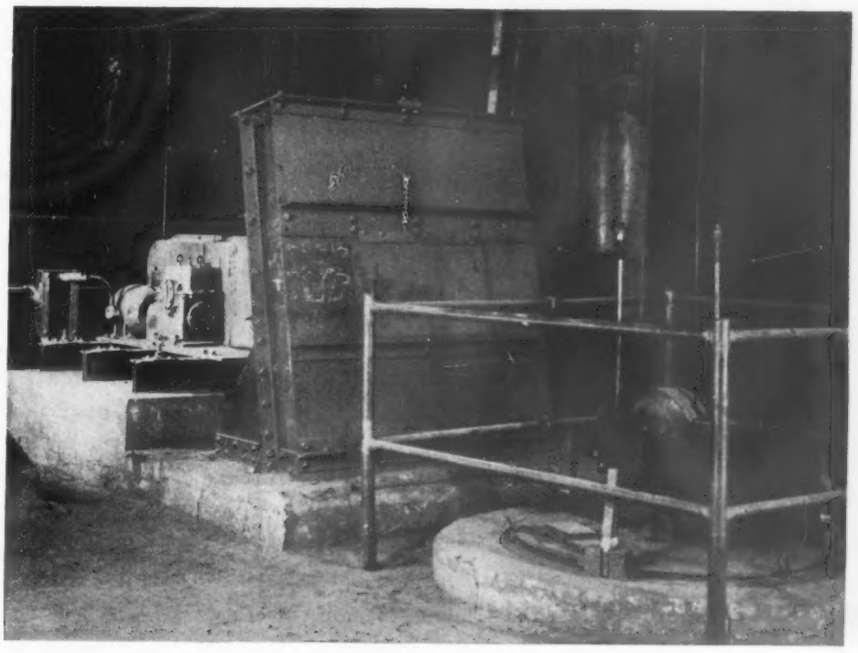


Fig. 4—Main reversing valve in an automatically-controlled commercial unit

Trainload of McKee Type Bins being shipped to one of the leading steel companies.

McKEE TYPE BINS . .

Proven by Wide Service

McKEE designed stock houses are preferred for blast furnace use by engineers and operators.

This is a logical result of efficient service. Furnaces of from 500 to 1000 tons daily capacity are being economically filled with McKee type bins operating in combination with McKee scale cars.

In installations during the last few years almost exclusive adoption of the McKee system has been the rule.

Experience has disclosed three outstanding advantages of McKee type bins. These are as follows:

1. Large capacity in low headroom.
2. Simplicity of design.
3. Low maintenance cost and ease of adaptability to existing stockhouse structures.

Twenty-Five years of specific engineering application to the improvement of Blast Furnace and Steel Plant efficiency. World wide recognition for devices and equipment that reduce costs and losses, safeguard employes, rationalize operations and increase production.

Still another noteworthy feature of the system is the automatic weighing and charging of coke without attention from the scale car operator.

McKee stockhouses save operating labor and cut down mechanical maintenance.

Full particulars will be sent upon request. We will prepare layouts and estimates for remodeling existing stockhouses.

ARTHUR G. McKEE & COMPANY

Engineers and Contractors · 2422 Euclid Avenue · Cleveland, Ohio

120 Broadway, New York · Bush House, Aldwych, W. C. 2, London

Associated with **The Whessoe Foundry and Engineering Co., Ltd., Darlington, Eng.; 25 Victoria St., S.W. 1, London**

perature. In other words, if the temperature difference limit set on the controller is 150 degrees Fahr., it does not matter whether the actual temperature is 1800 degrees or 2400 degrees Fahr. Fig. 1 shaws a furnace in successful commercial operation using the temperature difference method of automatic reversals.

Fig. 5 shows the thermocouples installed in the air flues. One thermocouple is for the control and the other is for a temperature recorder. This location has been found satisfactory and is recommended accordingly. The instruments to which these thermocouples are connected are shown on the board in Fig. 3. The right-hand instrument controls the reversal operation and the left-hand instrument gives a continuous chart record of temperature variations. Nichrome protection tubes have been found to stand up well in the air flues.

As previously mentioned, the actual reversal of an open-hearth furnace frequently calls for the opening and closing of many valves. This although not simple is merely a question of properly interlocking and timing operations which are electric motor actuated. Fig. 4 shows the main reversing valve for one installation which is controlled automatically.

In one plant where automatic temperature-difference reversal has been in use for some time, a furnace was selected which formerly had been the poorest performer in the shop of 14 furnaces. Within two months after installing the automatic reversal control, this furnace proved to be the most efficient in the shop.

High fuel savings have been reported by open-hearth operators using automatic reversal. At one plant the fuel economy averages 5 to 10 per cent; at another plant the saving runs as high as 23.8 per cent. In addition, one user reports saving 14 per cent in refractory costs, and a large increase in the number of heats per campaign.

High-Frequency Coreless Induction Furnace Provides Heat Uniformity

(*Concluded from Page* 41)

form of scale on the scrap and muck bar base materials.

Flux is provided by adding metallurgical calcined lime and special fluxing agents which form a slag to take up the oxides from the charge. The excess carbon in the charge, supplemented by the powerful reducing agents, silicon and manganese residual in the charge, reacts with these iron oxides and their consumptions (or loss) therefore is proportionate to the amount of iron oxide present. Furthermore, the time of adding ferromanganese, ferrosilicon or other deoxidizers also must be considered in the procedure if best quality and uniformity are to be expected from the product of this process.

No Alloys in Original Charge

Depending upon the chemical specification, when low-carbon content is desired, the manganese, silicon and alloys are not added with the original charge; only flux is added so the only reducing agent available to react with the oxides carried by the charge may be the excess carbon in the melt. The supplementary reducing agents are added later, combining and reacting with any residual oxides that have not been reduced by the carbon after which the necessary alloys are added to properly make up the analyses desired.

The refining period is the interval from the time the charge has just melted until the metal is poured. During this interval, the reducing action of the carbon and deoxidizers are given an opportunity to exert their influence, assisted by the refining effect of slag and temperature control. These agencies are augmented by the stirring action in the bath characterizing this process.

Bath Is Rotated

The stirring of the metal after the charge is molten, caused by the electrodynamic action, results in a rapid rotating movement of the metal in the vertical plane. The rotation is so great that in a bath of metal 16 inches diameter, the center of the bath rises approximately 1 inch above the metal at the circumference. The rapid circulation of the metal in contact with the slag and deoxidizers combined with accurate temperature control, quickly refines the metal, and the heat transference between the metal and the slag is sufficient to maintain the latter in a fluid condition sufficient to ensure intimate contact for the effective refining necessary to produce a homogeneous metallic bath.

After the refining period is completed, the power is shut off. The slag then covers the entire surface of the bath, and the metal is ready for pouring.

The molds are of special design for quality steel to provide a thoroughly sound ingot. The size of ingots vary from 4½ inches square, weighing 90 pounds, to 13 inches square weighing 3700 pounds, with varying intermediate sizes. A single heat, the product of a 650-pound furnace, may be cast into an 8¼-inch square ingot, or the product of the four furnaces may be cast into a 13-inch square mold.

Affords Direct Pouring

In the case of a single heat of 650 pounds capacity, the metal is poured direct through a heated refractory pouring funnel into the mold. The funnel prevents the slag from entering the mold and eliminates splashing of metal on the sides.

The contents of the larger furnaces are poured into a ladle, the metal and slag entering the ladle, after which the metal in the ladle is held for a sufficient time to enable the slag to rise to the surface and protect the metal from oxidization. This metal then is tapped from the bottom pour ladle into molds of various sizes.

Metal is poured into a test mold from the single furnace heats after the hot top is filled approximately 75 per cent, and approximately 50 per cent in the case of ladle heats. These tests immediately are sent to the laboratory for complete analysis.

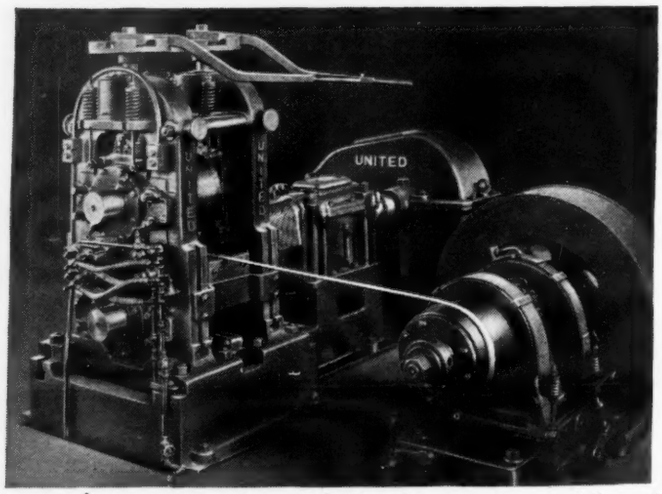
Sees X-Ray Inspection Used More Widely

An interesting example of the industrial use of X-rays is now going on at a plant where the autogyro planes are being constructed. Castings for the main support of the tripod arrangement, carrying the revolving autogyro, is subjected to severe strain, and X-ray investigations of these castings by the Westinghouse X-Ray Co., East Pittsburgh, Pa., have shown that external appeaerances are misleading. Every one of the castings inspected by X-ray has functioned satisfactorily.

According to Harold G. Petsing, educational director of the Westinghouse X-Ray Co., the day is approaching rapidly when industry will casually use X-rays to diagnose the various troubles and ills of the machinery it uses.

It is not generally known, he said, that a piece of aluminum 16 inches thick can be X-rayed within a few minutes, and any defects which may exist can be determined with the utmost precision and accuracy. The Aluminum Co. of America, has found that the X-ray examination of material in its plant costs about $2 per square foot of film, which is by no means excessive.

X-rays are being applied practically in the transportation field, especially by the German State railways, which are using the equipment in its shops as an every day tool of inspection to reveal concealed imperfections.



THE WORLD'S LARGEST MAKER OF

Three Major Factors Cause Most Paint Failures

BY H. S. JACOBY AND G. H. PICKARD
H. K. Ferguson Co., Cleveland

THREE major factors, the use of poor quality material, improper application, and application on surfaces which are not in proper condition, provide motivating causes for practically all cases in which paint has failed to perform the protective and decorative office expected of it. Paint can be bought at almost any price within reason that one cares to suggest so it is not unusual that improper material should so often cheapen a paint job. Another case of improper material is that in which good material is specified for the wrong location, a situation which exists all too often when executives specify paint without the proper knowledge of its capabilities and limitations.

Three specific locations account for the major quantity of paint used inside the modern industrial plant—structural steel, wood roofs, and brick sidewalls. In this discussion of some of the factors which must be overcome, it is assumed that atmospheric conditions are normal, and therefore high humidity and corrosive gases will not be considered.

Rust Prevention Essential

In the case of structural steel, the first coat of paint must be of such quality that it is held in place by adhesion and retards the formation of rust. Red lead, with its chemical and physical properties, comes closest to fulfilling both of these requirements.

Years ago the shop man objected so strenuously to red lead paint because of its harder application and quick hardening qualities, that other cheaper and inferior materials were used, with poor results. Improvements gradually have been made, however, until today ready mixed red lead paints of high grade are obtainable in a form that can be applied to steel at reasonable cost.

Less costly, but with high protective properties, is red oxide of iron, commonly called iron oxide. It is interesting to note that in the recent wrecking of the old Waldorf-Astoria hotel in New York, the only effect of time on the one coat of red oxide paint applied on the steel erected 40 years ago was to dull the high gloss of the paint. Natural oxides of high iron content are the best. At slight cost, the addition of about 10 per cent chromate adds greatly to the rust preventive properties of iron oxide which otherwise is only slightly inhibitive.

In the textile mill or furniture factory, where cleanliness and light are important, mill white paints are often used for field coats. During the past few years aluminum paint has made rapid strides and is adapted admirably for the finish coat in plants of many kinds. In the steel mill, the foundry or forge shop, a black graphite paint is recommended.

Many owners, desiring a finish coat of mill white paint, have felt it necessary to start with a shop coat of gray paint in order to cover to better advantage with the finish coat. On the other hand, no particular advantage has been found in coverage of white paint over a gray priming coat as compared with red, two coats of white being required in either case.

PAINT problems, the perennial trouble of mill owners, steel fabricators and superintendents of plants, include a host details. Methods of applications types of material and preparation of surfaces offer wide choice in the preparation for painting work. The accompanying article, abstracted from the monthly publication of the H. K. Ferguson Co., Cleveland, recommends a more complete knowledge of the conditions to be met before the paint is purchased, and dependence upon the paint manufacturer to meet these conditions. The authors, Hurlbut S. Jacoby and Glenn H. Pickard, are chief engineer and chemical engineer, respectively, of the Ferguson company.

Where a final coat of gray is desired, good coverage may be secured in one coat over a red priming coat. An added advantage in using two different colors is that any points which are missed in applying the final coat are immediately evident. Also, contrary to common conception, an eggshell or semi-gloss finish is far more satisfactory for a finish surface than gloss. The latter, with its greater oil content, attracts and holds dirt and dust and is harder to clean.

Being metallic, aluminum paint has its rightful place on structural steel, particularly as an after-coating. In addition to its excellent covering capacity and recognized durability, aluminum paint reflects light nearly as well as the average white paint. Unlike other pigments, aluminum powder need not be ground in oil. The simple stirring of the pigment into the vehicle to form a uniform suspension is all that is required to prepare the paint for use. It should, however, be mixed and applied the same day if possible to get the maximum leafing, the brightness and the hiding power.

Mixing Is Simple

The vehicle recommended for use with aluminum powder is a long oil spar varnish. Both the vehicle and the powder may be obtained from any reputable paint manufacturer. The powder is mixed with the vehicle in the proportion of two pounds per gallon. This gives approximately 1⅛ gallons of aluminum paint.

For finish coats on structural steel, graphite paints give excellent protection. Black or dark green are attractive colors obtainable with graphite pigments. Natural graphite is preferable for it possesses the faculty of "leafing" over a surface. The result is a shingle-like structure, highly impervious to moisture.

The lighter colors, such as gray, light green or white, cannot be produced if graphite is used in the pigment in sufficient quantity to be definitely effective. Hence, for these shades, white lead and oil or a combination of white lead and zinc oxide in oil should be used.

A source of paint failure too often overlooked is an improper condition of the surface to receive the paint. It would appear hardly necessary to point out that mud, concrete, and mortar should be removed thoroughly from all surfaces to be painted. It is not at all unusual to observe paint being applied over any or all of the items mentioned.

Grease and oil also cause much trouble, especially on steel. They should be removed with benzine or a suitable alkali. Mill scale and rust should be removed down to sound metal. If rust spots are painted over, rusting continues under the paint and finally pushes off the entire film. Badly rusted steel is best cleaned by use of a sand blast. However, if thor-

oughly performed, wire brushing is satisfactory. Dampness of the surface should be guarded against particularly.

No priming coat should be applied shortly after a rain, or during excessively humid weather. Painting during cold or frosty weather also should be avoided.

Careful Application

The capacity for service of any paint depends to a great extent upon the manner in which it is applied. If brushed on, it should be brushed out by repeated passages of the brush over the surface. Particularly is this essential in the case of rough surfaces. When paint is simply flowed on, without additional brushing, it lies on top of any extraneous film that may be on the surface. It bridges over irregularities in the surface without good contact and remains a coat of varying depth. Too thick a coat is liable to wrinkle. When this happens wear is uneven and repainting difficult. Too thin a coat is also objectionable as only a slight amount of chalking will expose the surface underneath.

Paint may be applied satisfactorily by spraying. Skill is required in handling the apparatus to secure best results and operators should be required to demonstrate their fitness for the work before being allowed to coat actual surfaces. A proper balance of paint and air volume, air pressure and distance of the nozzle from the surface is essential to good work.

Too much paint applied by spray causes wrinkling. Too little air causes poor atomization of the liquid and uneven coats result. Too low a pressure fails to force contact between surface and liquid; too much air drives the paint into a mist, resulting in abnormal loss of material and poor films. It may be seen that it requires skill and practice to lay on a good coat of paint with an air spray.

The most important factor in the intelligent selection of paint is knowledge of the conditions to be met. A large amount of research is constantly in progress in the laboratories of reliable paint manufacturers.

The good paint manufacturer can be depended upon to furnish a material which will meet the conditions unless he is handicapped by price restriction. Bearing in mind that the cost of a good job of painting for the average building is not more than 3 per cent of the entire cost of the building structure, and further that of this 3 per cent, only one-half constitutes the cost of paint material, one can see the folly of letting the price of paint itself stand in the way of obtaining a satisfactory result.

Gantry Crane of Self-Propelling Type Serves Ocean-Going Vessels

UNLOADING special ores and other bulk materials from ocean-going ships at Pier No. 6, Port Covington, Baltimore, now is accomplished by a gantry crane built by Wellman Engineering Co., Cleveland, for the Western Maryland Railroad Co. This crane which has a span of 57 feet 10 inches from center to center of crane tracks, is of the self-propelling type, with a hinged horizontal cantilever on each side overhanging the water. The trolley is equipped with a multiple-rope, heavy-duty ore bucket. Separate duplicate hoist units lift and lower the booms.

The bucket discharges into a traveling receiving hopper, is weighed, and discharged either directly into open railroad cars, or into box car loaders. When weighing is not required, the weighing hopper serves merely as a chute. The crane is carried on 24 spring-mounted truck wheels, one-half of which are driven by two motors, through gears and shafting.

Controls Centralized

The bucket, hoist and hold, and the trolley travel and main crane travel units are controlled from the operator's cab on the trolley,

The receiving hopper gates, the weighing hopper gates, scales and hopper travel are controlled from a cab on the traveling hopper framework. The loading chutes are operated from a platform accessible from the cab on the traveling hopper framework.

All motions are operated with 550-volt alternating current, with the exception of the bucket hoist which is operated on 230-volt direct current, supplied by a motor generator set to secure close regulation of this motion by a Ward-Leonard control with the advantages of dynamic braking when lowering. The hoist clutch and brake are power operated, by a single hand lever in the operator's cab. A car puller, located at each corner of the crane, is used for spotting cars.

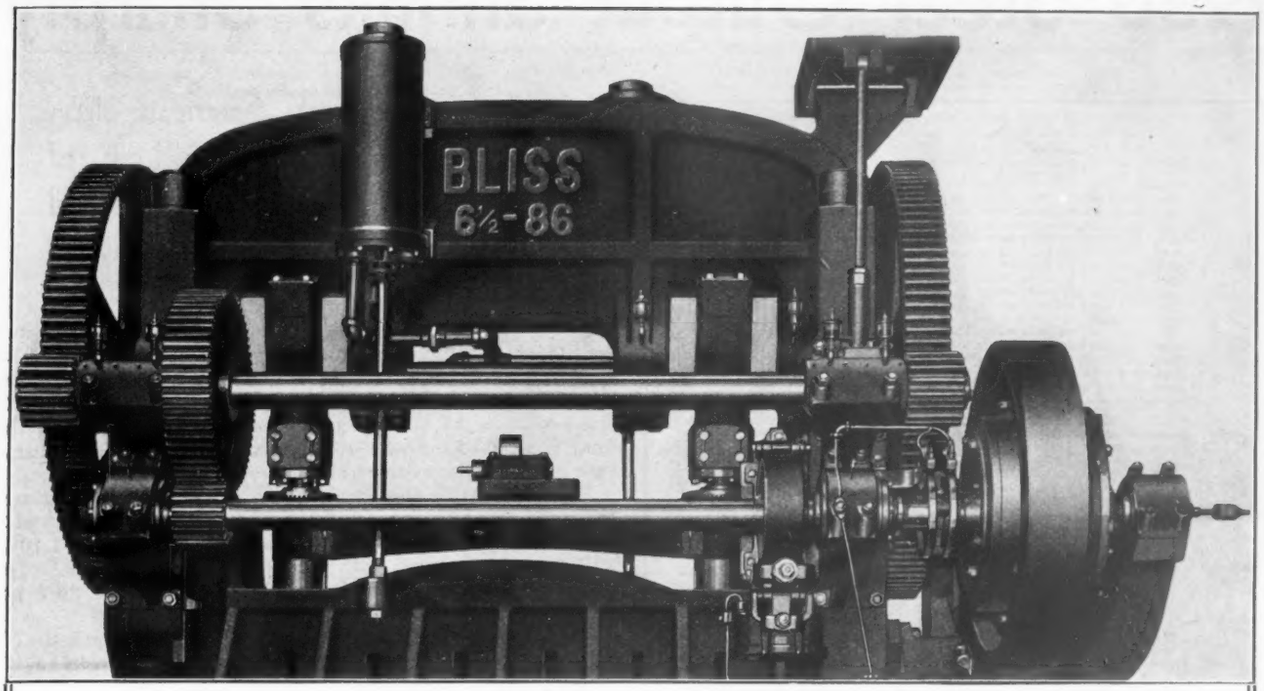
The crane is fitted with a 9-ton bucket and has a capacity of unloading at the rate of 400 to 650 tons per hour depending upon the material and type of boat.

Offers Course in Industrial Gas Engineering

A week's course in industrial gas engineering will be given at the University of Illinois, Urbana, Ill., beginning June 15, sponsored by the Illinois Gas association. Prof. D. B. Keyes, University of Illinois, will conduct the course. A. D. Frydendal, Peoples Gas Light & Coke Co., 122 South Michigan avenue, Chicago, will furnish detailed information.

Slag Association Re-elects

Officers of the National Slag association were re-elected at the fourteenth annual directors meeting held recently. They are: President, C. L. McKenzie, president, Duquesne Slag Products Co., Pittsburgh; vice president, C. E. Ireland, vice president, Birmingham Slag Co., Birmingham; and secretary-treasurer, H. J. Love, 937 Leader building, Cleveland.



SIMPLIFIED MULTIPLE SAFETY CONTROL

BLISS MULTIPLE DISC FRICTION CLUTCH

WITH MAGNETIC CLUTCH AND BRAKE CONTROL

COMPACT - POWERFUL - SENSITIVE

The BLISS Automatic Multiple Disc Friction Clutch with Magnetic Clutch and Brake Control meets the requirements of modern safety engineering in the simplest way. It is the first radical departure from the old single disc Friction Clutch with Magnetic Control.

The push-button system operates the clutch and the brake through an electrical controller. There is none of the mechanical clutch shifting gear. The only place about the clutch to lubricate is the Timken flywheel bearing.

The clutch proper is our standard multiple disc design which, *with its single screw adjustment,* has shown its quality in thousands of installations.

A small drum controller in a locked compartment gives easy selection of either automatic top stop, continuous running, or inching operation.

Any desired number of push-button stations may be supplied.

BLISS

E. W. BLISS CO. MAIN OFFICE AND WORKS BROOKLYN, N. Y., U. S. A.

Sales Offices

DETROIT	CLEVELAND	CHICAGO	DAYTON	ROCHESTER	NEW HAVEN	BOSTON	PHILADELPHIA
Fisher Bldg.	Guarantee Title Bldg.	Palmolive Bldg.	3d National Bldg.	Terminal Bldg.	2d Nat. Bk. Bldg.	Weld Bldg.	3701 N. Broad St.

American Factories: BROOKLYN, N. Y. HASTINGS, MICH. SALEM, OHIO

1930 Steel Output Shrinks Sharply

Final Statistics of American Iron and Steel Institute Show Loss of 27.8 Per Cent in Steel Ingots and Castings—Strip Makes Best Showing

PRODUCTION of steel ingots and castings in the United States in 1930 fell far below the all-time record of 1929, the total being 40,699,483 gross tons, compared with 56,433,473 tons in 1929. The loss in 1930 from 1929 is 27.8 per cent. These figures are from the final computations of the American Iron and Steel institute and constitute the official record for the industry.

Breaking down the total figures for ingots and castings, the former aggregated 39,595,268 tons, compared with 54,850,433 tons in 1929, and steel castings totaled 1,104,215 tons, compared with 1,583,040 tons in 1929. The loss in ingots was 27.8 per cent and in castings 30.2 per cent from 1929.

Included in the 34,268,316 tons of basic open-hearth steel ingots and castings produced in 1930 are 2,045,277 tons of duplex steel ingots and castings which were made from metal partly purified in bessemer converters and finally purified in basic open-hearth steel furnaces. This compares with 2,961,292 tons in 1929, a decrease of 916,015 tons, or 30.93 per cent. This is the smallest tonnage of duplex steel produced since 1922, and since 1916 only 1921 and 1922 yielded smaller totals. Duplex steel in 1930 was produced by five works in four states.

Alloy steel ingots and castings fell from 3,957,207 tons in 1929 to 2,443,311 tons in 1930, a decline of 38.2 per cent. This is a smaller total than for any year since 1925, although it is only slightly under the production of 1926. Electric steel accounted for 300,520 tons, compared with 510,030 tons in 1929.

Finished rolled iron and steel in 1930 totaled 29,513,007 tons, compared with 41,069,416 tons in 1929, a loss of 11,556,409 tons, or 39.1 per cent. The figure for 1929 was an all-time record. Of the total finished rolled production in 1930 iron accounted for 316,053 tons and steel for 29,196,954 tons. This is the smallest tonnage of rolled iron products reported by the institute and continues the steady decline of rolled iron. Of the total production in 1930, 98.93 per cent, was rolled from steel, compared with 98.84 per cent in 1929. Of the total production in 1930 Pennsylvania furnished about 35.64 per cent, against 36.18 per cent in 1929 and Ohio furnished about 20.57 per cent, against 21.46 per cent in 1929. In 1930 there were 308 plants in 27 states which rolled finished forms of iron or steel against 325 plants in 28 states producing these materials in 1929.

Finished rolled iron and steel tonnage produced in Pennsylvania was 10,519,101 tons, in Ohio, 6,471,154 tons; Indiana, 3,844,018 tons; Illinois, 2, 217,049 tons and New York 1,268,912 tons. No other state produced a million tons, though West Virginia came close to that mark with 983,677 tons.

Hot-rolled steel strip did relatively better in tonnage than others forms of finished rolled steel. With a total of 1,941,862 tons, it compared with 2,502,793 tons in 1929; only 1929 and 1928 gave a larger total output. In 1927 the total was 1,318,419 tons and no preceding year was larger. The 1930 total of hot-rolled strip included 669,698 tons up to and including 6 inches wide, 787,748 tons over 6 inches and including 24 inches wide, and 484,416 tons over 24 inches wide. In 1930 a total of 39 plants in 13 states rolled steel strip, compared with 33 plants in 13 states in 1929.

PRODUCTION OF STEEL INGOTS AND CASTINGS BY PROCESSES.

Years.	Open-hearth. Basic.	Open-hearth. Acid.	Open-hearth. Total.	Bessemer.	Crucible.	Electric.	Miscellaneous.	Total. Gross tons.
1916	29,616,658	1,798,769	31,415,427	11,059,039	129,692	168,918	604	42,773,680
1917	32,087,507	2,061,386	34,148,893	10,479,960	128,716	304,543	495	45,060,607
1918	32,476,571	1,982,820	34,459,391	9,376,236	115,112	511,364	329	44,462,432
1919	25,719,312	1,229,382	26,948,694	7,271,562	63,572	384,452	2,952	34,671,232
1920	31,375,723	1,296,172	32,671,895	8,883,087	72,265	502,152	3,535	42,132,934
1921	15,082,564	507,238	15,589,802	4,015,938	7,613	169,499	945	19,783,797
1922	28,387,171	921,812	29,308,983	5,919,298	28,606	346,039	....	35,602,926
1923	34,665,021	1,234,636	35,899,657	8,484,088	44,079	515,572	....	44,943,696
1924	30,719,523	857,827	31,577,350	5,899,590	22,473	432,526	...	37,931,939
1925	37,087,342	947,146	38,034,488	6,723,962	19,562	615,512	....	45,393,524
1926	39,653,315	1,038,664	40,691,979	6,934,588	15,493	851,723	....	48,293,763
1927	37,144,268	924,067	38,068,335	6,191,727	9,036	666,087	....	44,935,185
1928	43,200,483	913,473	44,113,956	6,620,195	7,769	802,260	....	51,544,180
1929	47,232,419	1,120,469	48,352,888	7,122,509	6,645	951,431	....	56,433,473
1930	34,268,316	780,856	35,049,172	5,035,459	2,253	612,599	....	40,699,483

PRODUCTION OF STEEL CASTINGS.

1916	605,512	570,937	1,176,449	142,791	9,351	42,870	302	1,371,763
1917	558,568	654,588	1,213,156	159,272	3,834	64,911	234	1,441,407
1918	505,880	634,950	1,140,830	160,844	1,330	108,296	110	1,411,410
1919	313,965	448,555	762,520	96,819	1,009	111,510	2,579	976,437
1920	449,330	537,070	986,400	104,980	1,729	155,196	3,237	1,251,542
1921	217,957	216,488	434,445	38,809	736	85,095	628	559,713
1922	425,981	404,767	830,748	47,733	1,045	154,982	....	1,034,508
1923	571,310	581,299	1,152,609	67,512	1,952	235,958	....	1,458,031
1924	456,518	402,901	859,419	53,437	1,377	206,549	....	1,120,782
1925	455,282	462,303	917,585	53,834	1,833	279,534	....	1,252,786
1926	480,627	505,379	986,006	43,066	2,041	326,445	....	1,357,558
1927	393,881	430,414	824,295	38,024	1,340	294,809	....	1,158,468
1928	381,926	458,590	840,516	28,450	1,253	348,568	....	1,218,787
1929	588,213	544,076	1,132,289	30,829	883	419,039	....	1,583,040
1930	369,798	413,675	783,473	14,871	690	305,181	....	1,104,215

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS.

Years.	Ingots.	Castings.	Total.	Years.	Ingots.	Castings.	Total.
1917	1,576,806	67,529	1,644,335	1924	1,940,461	85,948	2,026,409
1918	1,721,367	66,485	1,787,852	1925	2,320,390	112,583	2,432,973
1919	1,435,816	45,372	1,481,188	1926	2,317,313	146,101	2,463,414
1920	1,591,939	68,353	1,660,292	1927	2,385,904	145,844	2,531,748
1921	769,293	40,255	809,548	1928	3,045,225	169,684	3,214,909
1922	1,614,392	59,104	1,673,496	1929	3,764,287	192,920	3,957,207
1923	2,014,269	92,220	2,106,489	1930	2,317,183	126,128	2,443,311

Similar statistics are not available prior to 1909.

PRODUCTION OF ALLOY STEEL INGOTS AND CASTINGS BY PROCESSES, GROSS TONS, 1929–1930.

Processes.	1930—Gross tons. Ingots.	Castings.	Total.	Total, 1929.
Open-hearth steel—basic	1,994,607	15,364	2,009,971	3,240,530
Open-hearth steel—acid	33,627	14,957	81,384	108,007
Bessemer steel	46,093	4,562	50,655	96,312
Crucible steel	576	5	581	2,328
Electric steel	239,280	61,240	300,520	510,030
Total Gross tons	2,317,183	126,128	2,443,311	3,957,207

In 1930 there were 210 works in 31 States, the District of Columbia and Alaska which made alloy steel ingots or castings.

TOTAL PRODUCTION OF ALL KINDS OF FINISHED ROLLED IRON AND STEEL, GROSS TONS, 1890–1930.

Years.	Iron and steel rails.	Plates and sheets.	Wire rods.	Structural shapes.	Nail plate.	All other finished rolled.	Total Gross tons.
1890	1,885,307	809,981	457,099	.....	251,828	2,618,660	6,022,875
1891	1,307,176	678,927	536,607	.....	223,312	2,644,941	5,390,963
1892	1,551,844	751,460	627,829	453,957	201,342	2,579,482	6,165,814
1893	1,136,458	674,345	537,272	387,307	136,113	2,104,190	4,975,685
1894	1,021,772	682,900	673,402	360,305	108,262	1,795,570	4,642,211
1895	1,306,135	991,459	791,120	517,920	95,085	2,487,845	6,189,574
1896	1,122,010	985,776	623,986	495,571	72,137	2,236,361	5,515,841
1897	1,647,892	1,207,286	970,736	583,790	94,054	2,497,970	7,001,728
1898	1,981,241	1,448,301	1,071,683	702,197	70,188	3,239,760	8,513,370
1899	2,272,700	1,903,505	1,036,398	850,376	85,015	4,146,425	10,294,419
1900	2,385,682	1,794,528	846,291	815,161	70,245	3,575,536	9,487,443
1901	2,874,639	2,254,425	1,365,934	1,013,150	68,850	4,772,329	12,349,327
1902	2,947,933	2,665,409	1,574,293	1,300,326	72,936	5,383,219	13,944,116
1903	2,992,477	2,599,665	1,503,455	1,095,813	64,102	4,952,185	13,207,697
1904	2,284,711	2,421,398	1,699,028	949,146	61,601	4,597,497	12,013,381
1905	3,375,929	3,532,230	1,808,688	1,660,519	64,542	6,398,107	16,840,015
1906	3,977,887	4,182,156	1,871,614	2,118,772	54,211	7,383,828	19,588,468
1907	3,633,654	4,248,832	2,017,583	1,940,352	52,027	7,972,374	19,864,822
1908	1,921,015	2,649,693	1,816,949	1,083,181	45,747	4,311,608	11,828,193
1909	3,023,845	4,234,346	2,335,685	2,275,562	63,746	7,711,506	19,644,690
1910	3,636,031	4,955,484	2,241,830	2,266,890	45,294	8,475,750	21,621,279
1911	2,822,790	4,488,049	2,450,453	1,912,367	48,522	7,316,990	19,039,171
1912	3,327,915	5,875,080	2,653,553	2,846,487	45,331	9,908,475	24,656,841
1913	3,502,780	5,751,037	2,464,807	3,004,972	37,503	10,030,144	24,791,243
1914	1,945,095	4,719,246	2,431,714	2,031,124	38,573	7,204,444	18,370,196
1915	2,204,203	6,077,694	3,095,907	2,437,003	31,929	10,546,188	24,392,924
1916	2,854,518	7,453,980	3,518,746	3,029,964	30,088	15,493,093	32,380,389
1917	2,944,161	8,267,616	3,137,138	3,110,000	22,864	15,585,921	33,067,700
1918	2,540,892	8,799,135	2,562,390	2,849,969	18,310	14,365,058	31,155,754
1919	2,203,843	7,372,814	2,538,479	2,614,036	12,832	10,359,543	25,101,544
1920	2,604,116	9,337,680	3,136,907	3,306,748	20,577	13,941,535	32,347,863
1921	2,175,818	4,260,574	1,564,330	1,272,624	14,573	5,483,087	14,774,006
1922	2,171,776	7,968,397	2,654,741	2,718,768	21,969	10,916,353	26,452,004
1923	2,904,516	9,497,717	3,075,854	3,405,197	22,833	14,370,921	33,277,076
1924	2,433,332	8,087,883	2,522,545	3,283,708	22,175	11,736,792	28,086,435
1925	2,785,257	9,807,659	2,844,656	3,604,130	22,038	14,323,220	33,386,960
1926	3,217,649	10,529,056	2,722,032	3,911,663	17,337	15,098,155	35,495,892
1927	2,806,486	9,627,734	2,770,271	3,742,445	18,051	13,914,044	32,879,031
1928	2,647,493	11,006,050	3,080,816	4,096,143	16,200	16,816,214	37,662,916
1929	2,722,138	12,436,312	3,134,409	4,778,020	9,827	17,988,710	41,069,416
1930	1,873,233	9,067,366	2,348,600	3,512,473	*	12,711,335	29,513,007

*Included in "all other finished rolled."

Prior to 1887 complete statistics of the production of all forms of finished rolled iron and steel are not available.

From High Record of Previous Year

PRODUCTION OF MERCHANT BARS, SHOWING IRON AND STEEL MERCHANT BARS SEPARATELY, GROSS TONS, 1911–1930.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1911..	835,625	2,211,737	3,047,362	1921.	198,334	1,367,430	1,565,754
1912..	944,790	2,752,324	3,697,114	1922.	317,665	3,660,993	3,978,658
1913..	1,026,632	2,930,977	3,957,609	1923.	404,730	5,148,066	5,552,796
1914..	563,171	1,960,460	2,523,631	1924.	258,737	4,022,184	4,280,921
1915..	657,107	3,474,135	4,131,242	1925.	290,488	5,368,827	5,659,315
1916..	993,948	5,236,354	6,230,302	1926.	252,437	5,221,399	5,473,836
1917..	983,926	5,226,031	6,209,957	1927.	187,995	4,682,252	4,870,247
1918..	846,898	5,395,851	6,242,749	1928.	165,277	6,112,558	6,277,835
1919..	446,549	3,945,075	4,391,624	1929.	154,690	6,316,456	6,471,146
1920..	663,032	5,467,208	6,130,240	1930	95,234	4,043,130	4,138,364

PRODUCTION OF CONCRETE BARS, SHOWING IRON AND STEEL CONCRETE BARS SEPARATELY, GROSS TONS, 1915–1930.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1915.....	.....	353,408	353,408	1923.....	368	680,499	680,867
1916.....	2,683	458,717	461,400	1924.....	507	655,615	656,122
1917.....	1,497	469,687	471,184	1925.....	1,195	818,392	819,587
1918.....	468	344,152	344,620	1926.....	1,649	814,180	815,829
1919.....	2,295	416,726	419,021	1927.....	2,428	813,585	816,013
1920.....	698	571,747	572,445	1928.....	462	951,426	951,888
1921.....	1,094	226,134	227,228	1929.....	557	951,793	952,350
1922.....	696	575,120	575,816	1930.....	160	849,991	*850,151

PRODUCTION OF HEAVY AND LIGHT STRUCTURAL SHAPES, GROSS TONS, 1919–1930.

Years.	Heavy shapes.	Light shapes.	Total.	Years.	Heavy shapes.	Light shapes.	Total.
1919..	2,136,424	477,612	2,614,036	1925.	3,049,817	554,313	3,604,130
1920..	2,741,120	565,628	3,306,748	1926.	3,330,572	581,091	3,911,663
1921..	1,082,727	189,897	1,272,624	1927.	3,083,211	650,234	3,742,445
1922..	2,337,026	381,742	2,718,768	1928.	3,408,545	687,598	4,096,143
1923..	2,917,446	487,751	3,405,197	1929.	4,055,615	722,405	4,778,020
1924..	2,805,084	478,624	3,283,708	1930.	3,010,847	501,626	3,512,473

PRODUCTION OF SKELP SHOWING IRON AND STEEL SKELP SEPARATELY, GROSS TONS, 1915–1930.

Years.	Iron.	Steel.	Total.	Years.	Iron.	Steel.	Total.
1915....	262,198	2,037,266	2,299,464	1923....	216,846	3,517,490	3,734,336
1916....	355,445	2,572,229	2,927,674	1924....	165,581	3,004,962	3,170,543
1917....	336,591	2,337,640	2,674,231	1925....	178,586	3,051,182	3,229,768
1918....	258,500	2,305,511	2,564,011	1926....	189,774	3,574,776	3,764,550
1919....	192,146	2,363,632	2,555,778	1927....	156,204	3,262,648	3,418,852
1920....	252,403	2,967,886	3,220,289	1928....	140,318	3,228,655	3,368,973
1921....	115,523	1,815,052	1,930,575	1929....	151,556	3,365,682	3,517,238
1922....	218,868	2,653,347	2,872,215	1930....	114,426	2,567,620	2,682,046

PRODUCTION OF SEAMLESS STEEL TUBES, GROSS TONS, 1925–1930.

Years	Hot finished.	Cold drawn.	Total.	Years.	Hot finished.	Cold drawn.	Total.
1925....	403,965	164,225	568,190	1928....	906,032	172,895	1,078,927
1926....	620,936	154,393	775,329	1929....	1,097,459	206,026	1,303,485
1927....	725,970	138,170	864,140	1930....	1,090,175	103,542	1,193,717

PRODUCTION OF TINPLATES AND TERNE PLATES, 1905–1930.

Years.	Tinplates.	Terne plates.	Total pounds.
1905	.....	.....	1,105,440,000
1906	1,100,373,000	193,367,000	1,293,740,000
1907	996,650,000	156,447,000	1,153,097,000
1908	1,048,896,000	154,179,000	1,203,075,000
1909	1,179,858,000	190,930,000	1,370,788,000
1910	1,450,821,000	168,184,000	1,619,005,000
1911	1,597,629,000	158,441,000	1,756,070,000
1912	1,965,659,000	191,396,000	2,157,055,000
1913	1,708,186,000	136,944,000	1,845,130,000
1914	1,939,785,000	146,195,000	2,085,980,000
1915	2,201,825,054	163,470,646	2,365,295,700
1916	2,552,224,275	214,176,952	2,766,401,227
1917	3,233,314,911	153,891,653	3,387,206,564
1918	3,216,247,675	85,376,569	3,301,624,244
1919	2,407,156,757	171,859,924	2,579,016,681
1920	3,079,953,351	158,067,437	3,238,020,788
1921	1,675,320,852	103,853,961	1,779,174,813
1922	2,707,648,715	177,235,512	2,884,884,227
1923	3,168,263,546	*207,106,248	3,375,369,794
1924	2,975,231,674	*202,553,793	3,177,785,467
1925	3,458,574,585	*254,885,172	3,713,459,757
1926	3,750,481,879	*241,883,727	3,992,365,606
1927	3,546,778,888	*235,347,756	3,782,126,644
1928	3,841,576,534	*278,241,691	4,119,818,225
1929	4,068,338,817	*340,608,132	4,408,946,949
1930	3,719,128,284	*230,983,261	3,950,111,545

* Includes 184,873,512 pounds of long terne plates in 1930, 253,601,576 pounds in 1929, 203,027,669 pounds in 1928, 152,371,845 pounds in 1927, 152,457,892 pounds in 1926, 163,820,675 pounds in 1925, 107,986,974 pounds in 1924, and 106,764,720 pounds in 1923.

PRODUCTION OF CAST-IRON PIPE AND FITTINGS, 1929–1930.

Kinds of pipe.	1929—Net tons.			1930—Net tons.		
	Pipe.	Fittings.	Total	Pipe.	Fittings.	Total.
Gas and water*....	1,238,177	54,929	1,293,106	1,138,862	47,177	1,186,039
Soil and plumbers.	266,435	91,050	357,485	188,040	61,857	249,897
Total.....	1,504,612	145,979	1,650,591	1,326,902	109,034	1,435,936

* Includes culvert pipe.

PRODUCTION OF IRON AND STEEL GALVANIZED SHEETS AND GALVANIZED FORMED PRODUCTS, 1920–1930.

Years.	Galvanized sheets.	Galvanized formed products.*	Total. Pounds.
1920.....	1,871,360,951	143,894,730	2,015,255,681
1921.....	1,366,883,503	109,956,328	1,476,839,831
1922.....	2,109,991,396	165,713,067	2,275,704,463
1923.....	2,364,862,856	165,741,098	2,530,603,954
1924.....	2,228,960,835	155,901,514	2,384,862,349
1925.....	2,539,112,552	178,219,576	2,717,332,128
1926.....	2,788,473,075	154,572,764	2,943,045,839
1927.....	2,767,615,399	168,500,559	2,936,116,258
1928.....	3,040,763,695	172,453,640	3,213,217,335
1929.....	3,083,975,953	177,727,692	3,261,703,645
1930.....	2,323,911,607	146,094,351	2,470,005,958

* Articles formed or stamped from iron or steel black plates or black sheets and galvanized after the completion of the forming or stamping process.

PRODUCTION OF PLATES AND SHEETS BY KINDS, 1915–1930.

Years. Gross tons.	Universal plates.* Gross tons.	Sheared plates. Gross tons.	Total universal and sheared plates. Gross tons.	Black sheets rolled on sheet or jobbing mills. Gross tons.	Black plates rolled on tin mills.—Gross tons.		Total black sheets and black plates. Gross tons.
					Black plates for tinning.	Other black plate specialties.	
1915...	954,852	1,923,199	2,878,051	1,836,786	1,093,345	269,512	3,199,643
1916...	1,224,234	2,453,150	3,677,384	2,249,597	1,274,137	252,862	3,776,596
1917...	1,195,199	2,963,039	4,158,238	2,367,752	1,505,338	236,288	4,109,378
1918...	1,234,782	3,885,126	5,119,908	2,073,639	1,489,586	116,002	3,679,227
1919...	992,054	2,899,267	3,891,321	2,099,840	1,144,601	237,052	3,481,493
1920...	1,249,769	3,505,364	4,755,133	2,886,401	1,449,330	246,816	4,582,547
1921...	570,610	1,189,714	1,760,324	1,511,817	786,962	201,471	2,500,250
1922...	1,248,413	2,171,507	3,419,920	2,917,236	1,266,652	364,589	4,548,477
1923...	1,304,227	2,864,518	4,168,745	3,503,071	1,498,830	327,071	5,328,972
1924...	1,001,694	2,147,171	3,148,865	3,266,430	1,415,182	257,406	4,939,018
1925...	1,196,021	2,557,430	3,753,451	4,096,832	1,632,236	325,140	6,054,208
1926...	1,407,547	2,793,635	4,201,182	4,237,479	1,761,944	328,451	6,327,874
1927...	1,244,549	2,476,261	3,720,810	3,979,037	1,657,215	270,672	5,906,924
1928...	1,304,356	2,609,272	3,913,628	4,962,410	1,791,021	338,991	7,092,422
1929...	1,425,300	3,596,841	5,022,141	5,254,998	1,698,640	460,533	7,414,171
1930...	1,040,715	2,622,108	3,662,823	3,511,557	1,691,938	201,048	5,404,543

* Include flats and bars over 6 inches wide.

PRODUCTION OF WROUGHT PIPE AND SEAMLESS STEEL TUBES, INCLUDING BOILER TUBES, GROSS TONS, IN 1930.

Kinds of pipe or tubes.	*Lap weld and butt weld pipe or tubes—Gross tons.			Seamless pipe or tubes—Gross tons.		
	Iron	Steel.	Total welded.	†Hot finished.	Cold drawn.	Total seamless.
Black, standard.....	46,924	910,571	957,495	16,222	1,410	17,632
Galvanized.....	30,798	361,202	392,000	2,154	.....	2,154
Oil country goods.....	12,550	677,229	689,779	912,003	1,760	913,763
Mechanical tubes.....	.....	.....	.....	40,784	51,850	92,634
O. D. & miscellaneous....	.....	177,516	177,516	5,643	23,700	29,343
Boiler tubes.....	7,039	23,559	30,598	113,369	24,822	138,191
Total.....	97,311	2,150,077	2,247,388	1,090,175	103,542	1,193,717

* Does not include pipe or tubes made by the electric or acetylene welded processes.
† Does not include hot finished tubes subsequently cold drawn.

PRODUCTION OF MISCELLANEOUS ROLLED PRODUCTS. GROSS TONS.

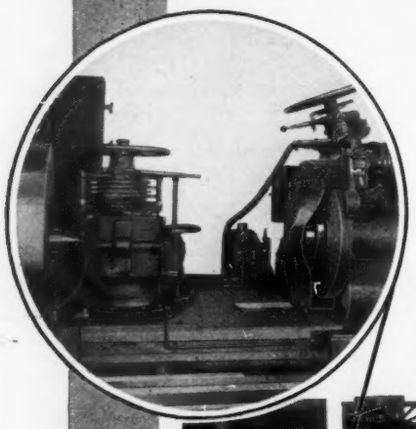
Products.	1926.	1927.	1928.	1929.	1930.
Hoops.....	189,814	176,300	176,226	204,246	79,844
Cotton ties and baling bands.....	355,926	323,129	384,200	354,706	46,194
Long angle splice bars, fish-plate bars, etc.....	953,563	864,992	797,650	924,803	606,390
Rolled sheet piling.....	57,189	74,793	62,071	102,494	105,603
Railroad ties.....	13,278	13,826	12,266	13,718	10,614
Rolled forging blooms, forging billets, etc.....	332,750	285,527	554,475	527,336	304,090
Blooms, billets, sheet bars, etc., for export.....	430	549	11,139	40,015	9,485
Blanks or pierced billets for seamless tubes.....	883,598	869,336	1,190,658	1,382,171	1,248,155
Spike and chain rods, bolt and nut rods, etc.....	1,005,303	862,061	866,845	965,694	685,673
Total.....	3,821,851	3,490,513	4,055,530	4,545,183	3,096,049

PRODUCTION OF CUT NAILS IN 100-LB. KEGS, 1919–1930.

Years.	Production.	Exports.	Consumption	Years.	Production.	Exports.	Consumption.
1919...	394,477	65,423	329,054	1925...	736,111	36,265	699,846
1920...	844,583	86,427	758,156	1926...	662,403	23,979	638,424
1921...	538,834	24,512	514,322	1927...	702,836	25,715	677,121
1922...	810,206	78,602	731,604	1928...	619,784	29,042	590,742
1923...	829,604	51,515	778,089	1929...	533,833	20,124	513,709
1924...	741,668	47,537	694,131	1930...	459,923	10,589	449,334

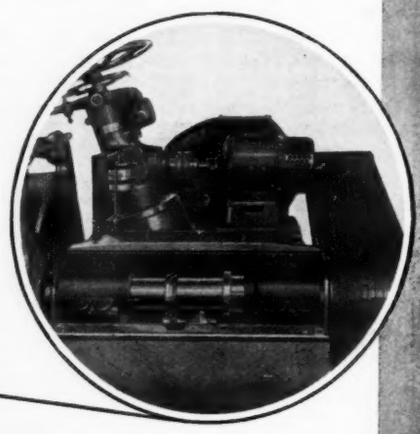
FORCE FEED LUBRICATION

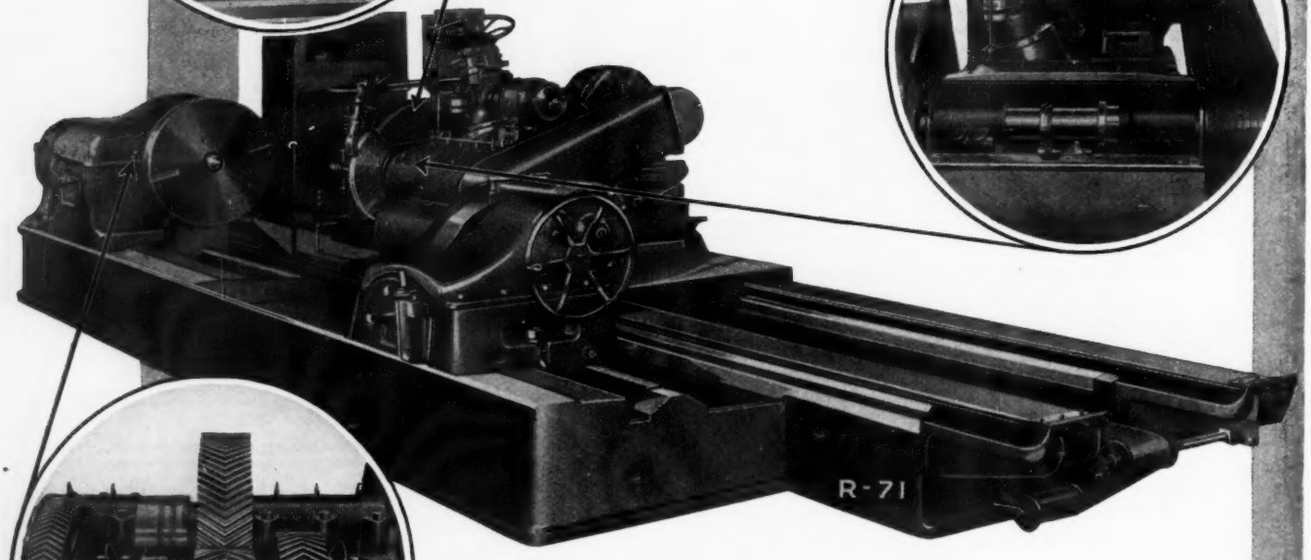
on The New LANDIS TYPE 30 ROLL GRINDERS

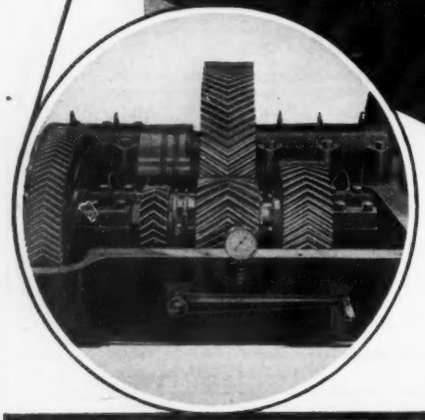


Wheel spindles and bearings should at no time lack a goodly quantity of oil. Nor do they on the new Landis Roll Grinder. Continuous lubrication is provided, the pump being driven from a silent gear on the spindle itself

Massive, heavy-duty equipment such as the new Landis Roll Grinders must never want for plenteous lubrication. A force feed system guarantees delivery of a constant supply to the wheel carriage ways and the traversing mechanism.







Driving huge rolls day after day demands much of all moving headstock parts. The way is smoothed, however, by ample, never-failing force-feed lubrication.

LANDIS TOOL COMPANY
WAYNESBORO PENNSYLVANIA

DETROIT CHICAGO NEWARK PHILADELPHIA

77

Announce Technical Papers for High-Temperature Symposium in Chicago

NEARLY 30 technical papers will be contributed to the symposium on effect of temperature on the properties of metals to be conducted jointly by the American Society of Mechanical Engineers and American Society for Testing Materials in Hotel Stevens, Chicago, June 23, during the annual meeting of the latter society. Seven years have elapsed since the last conference on this subject, and with the rapid progress of the last few years the coming session attaches considerable interest.

Two sessions are scheduled, the first on the engineering needs and trends in the industries using alloys at high temperatures, and the other on the properties of the alloys available for such uses. Metallurgical industries are especially interested in these alloys for not only do they supply them to other industries, but they require them in their own processes.

Individual papers will not be read or abstracted in detail at the meeting, instead, one general summary of the papers will be presented at each session, after which the subjects will be thrown open for a general round table discussion. All papers are to be preprinted and will be available from the American Society for Testing Materials, 1315 Spruce street, Philadelphia.

Papers scheduled for preesntation are as follows:

Requirements for Metals at High and Low Temperatures

"Needs of the Power Plant Industry"—"Steam Boilers and Superheaters" by H. J. Kerr, Babcock & Wilcox Co.; "Turbines," by R. C. Allen, Westinghouse Electric & Mfg. Co.; "Valves, Pipes and Fittings," by F. W. Martin, Sargent & Lundy Inc.

"Needs of the Oil Industry," by E. S. Dixon, The Texas Co.

"Corrosion and Other Problems in the Use of Metals at High Temperatures in the Chemical Industry," by F. H. Rhodes, professor of industrial chemistry, Cornell university.

"Needs of the Ferrous Metal Industries," by J. C. Woodson, Westinghouse Electric & Mfg. Co.

"Needs of the Nonferrous Smelting Industries," by R. E. Brown, Electro Metallurgical Corp.

"Needs of the Automotive and Aeronautic Industries," by A. L. Boegehold, General Motors Corp., and J. B. Johnson, chief of material branch, war department, Wright Field.

"Needs of the Ceramic Industries," by C. E. Williams, Battelle Memorial institute.

"Engineering Trends in the Use of Metals at High Temperatures," by J. H. S. Dickenson, Vickers Works; R. W. Bailey, Metro-Vickers Co.; Dr. Pearson and Dr. Inglis, Imperial Chemical Industries, England.

"Influence of Temperature on Properties of Heat-Resistant Alloys," by Drs. B. Strauss, Schotty and Schaftmeister, Fried. Krupp A. G., Essen, Germany.

"Fundamental Phenomena Governing the Performance of Metals in High Temperature Service," by Dr. P. Chevenard, Societe de Commentry-Fourchambault et Decazeville. Imphy, France.

Properties of Available Metals for High and Low Temperature Service

"Zinc-Base Alloys at Temperatures Above Atmospheric," by H. A. Anderson, Western Electric Co.

"Light Alloys of Aluminum and Magnesium at High and Low Temperatures," by R. L. Templin, Aluminum Co. of America.

"Bearing Metals," by E. R. Darby, Federal-Mogul Corp.

"High-Temperature Properties of Copper-Base Alloys," by W. B. Price, Scovill Mfg. Co.

"Creep Data on Wrought Carbon and Low Alloy Steels," by A. B. Spooner, Bethlehem Steel Corp., and F. B. Foley, Midvale Co.

"High and Low Temperature Properties of Cast Carbon and Low Alloy Steels," by R. A. Bull, Electric Steel Founders' Research Group.

"Cast and Malleable Iron Properties at High Temperatures," by J. W. Bolton, Lunkenheimer Co., and H. Bornstein, Deere & Co.

"Wrought Austenitic Heat-Resisting Alloys," by E. C. Bain, United States Steel Corp.

"Cast Austenitic Alloys and Nonaustenitic Wrought Alloys of Iron, Nickel and Chromium," by N. B. Pilling, International Nickel Co.

"Nickel and Nickel Alloys Other Than Iron, Nickel and Chromium Alloys," by C. A. Crawford and R. Worthington, International Nickel Co.

"High-Chromium Steels for Extreme Service Conditions," by C. E. MacQuigg, Electro Metallurgical Corp.

"Properties of the Rare Metals for High Temperature Service," by W. H. Swanger, United States bureau of standards.

"Effect of Temperature on the Properties of Nitrided Alloys," by O. E. Harder, Battelle Memorial institute.

"Low-Temperature Properties of Metals," by H. W. Russell, Battelle Memorial institute.

"Thermal Expansion of Metals in Relation to High Temperature Service," by N. L. Mochel, Westinghouse Electric & Mfg. Co.

"Thermal Conductivity of Metals in Relation to High Temperature Service," by M. S. Van Dusen, United States bureau of standards.

"Bibliography of Recent Literature on Effect of Temperature on Properties of Metals," by L. F. McCombs, Battelle Memorial institute.

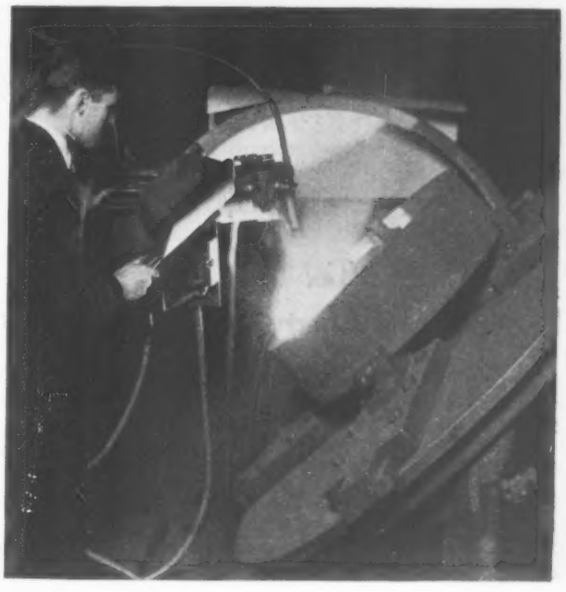
Devises Color Scheme for Marking Steel Bars

A new scheme for marking steel bars has been evolved by A. J. Copeland, assistant manager, Industrial Brownhoist Corp., Bay City, Mich. and former chairman of the iron and steel committee, National Association of Purchasing Agents.

A standardization of color has been set up in the code by assigning a definite color to a given carbon content, and using that color on various backgrounds. The background color determines the general classification, and the second color, in the form of a stripe, indicates the carbon content of the steel.

The code simplifies the identification of steels of the Society of Automotive Engineers by assigning to each group or series a separate background color. When a series number changes, so does the color. Each carbon content is identified by the same color (stripes) in all series of classifications. Dots are used instead of stripes in three instances to keep the code easy to understand and memorize by those handling materials.

IN FABRICATING welded rotor spiders made up of plates thicker than 5/16-inch, it is necessary to tilt the work to obtain full strength fillets between the web and rim. The accompanying illustration shows the special tool designed by the Westinghouse Electric & Mfg. Co. to tilt the work so that the two surfaces to be joined are inclined at a 45-degree angle to the vertical. This forms a trough for the weld metal and permits maximum welding currents and metal deposit



New Books Worth Reading

SCIENCE ◆ ECONOMICS ◆ BUSINESS

Virginia an Early Iron and Steel Producer

Virginia Iron Manufacture in the Slave Era, by Kathleen Bruce, Ph. D.; 482 pages, 6 x 9 inches; published for the American Historical association by the Century Co., New York; supplied by STEEL, Cleveland, for $4.50 plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 22s 6d, postage extra.

That considerable industry existed in the South before the Civil war and that agriculture did not engross the entire attention of the southern people is revealed in this careful study and presentation of the iron industry in Virginia from 1607 to the close of the Civil war. The slave also is shown as an industrial asset of no mean value.

The iron industry, dependent on slave labor to a considerable degree, had been developed sufficiently to have a vital effect on the course of the Civil war and doubtless enabled the South to maintain its position months and years beyond the time it must have failed except for the iron works at Richmond.

The author first traces the iron industry from Jamestown, 1607, shows its contribution to the Revolutionary war, traces its decline and then the revival at Richmond where water-power and coal brought it to a high development in 1860. The latter chapters trace its contribution to the Confederacy by its own products and its nurture of other ironworks in the deeper South.

The author is professor of history at the College of William and Mary, a graduate of Radcliffe and formerly associate professor of history and government at Wheaton college. To the student of history of the iron and steel industry in America her volume is indispensable, as it is compiled from sources not accessible to the public.

◆

British Income Tax Reduced to a Chart

Tolley's Income Tax Chart-Manual (British); by Charles H. Tolley, paper; supplied by STEEL, Cleveland, for $1, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 3s 6d net.

The fifteenth edition of this publication incorporates alterations made by the finance act of 1930, with legal decisions and changes in official practice to July, 1930, and the taxation system of the Irish Free State for 1930 and 1931.

A complicated matter at best, with decisions and official practices grown into a perplexing web, the income tax system of England is covered in this manual with cross reference and citation of decisions that enable the taxpayer to steer clear of pitfalls. Important changes by the 1930 finance act make this edition necessary in preparing returns, Arrangement of the pages and overleaves is unusual but makes for ease in referring to the various sections.

◆

Research Laboratories and Directors Are Listed

Industrial Research Laboratories, published by the National Research council, Washington: supplied by STEEL, Cleveland, for $2, plus 15 cents postage: in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 10s, postage extra.

In this volume are listed 1625 laboratories engaged in industrial research in the United States and 1900 directors of research. A geographical and a subject index are also included to aid in finding the laboratory sought.

This is the fourth edition, revised and enlarged, with latest information available in this field, as far as laboratory authorities would furnish information for publication.

◆

How American Methods Aided German Company

Ludwig Loewe & Co. A-G., Berlin, 1869/1929; published in connection with the sixtieth jubilee of the firm; sold by VDI-Verlag G.m.b.H., Berlin; linen, 212 pages, 8½ x 11½ inches, with 155 illustrations and 10 full-page charts; supplied by STEEL, Cleveland, for $4.50, plus 15 cents for postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 15 rentenmarks, postage extra.

Difficulties experienced during the years immediately following the war influenced the Ludwig Loewe A.-G. to dispense with this memorial publication at the time of its fiftieth anniversary. However, in order to present the story of the firm in full, this was prepared for the sixtieth.

The publication is in two parts, the story of the firm and a description of the technical development of Ludwig Loewe A.-G. The first part was edited by Prof. Dr. Ing. D. h. C. Matschoss, widely known for his technical and historical research. He relates how Ludwig Loewe, inspired by American production methods, founded a plant for the manufacture of sewing machines, how he applied his method in producing other articles, then turned to the manufacture of weapons, and finally produced machine tools, which at first were constructed for his own use and later for sale.

Prof. Dr. Ing. G. Schlesinger, for many years a co-worker of Ludwig Loewe, describes the technical development of this company. He does not confine himself to the description of the technical equipment in the various stages of development of the company, but includes the changing cost systems in use from time to time, the changes in wages paid, and the attention given to the social welfare of the employes. The story closes with the entrance of the company into the field of electrical appliances.

Publications of this kind usually adhere closely to the development of a single company and for that reason reach only a limited number of readers. The story of the Loewe firm, however, is of value not only to close associates, but to the entire machine tool industry.

◆

Rationalization of German Industry Is Outlined

Rationalization of German Industry, cloth, 182 pages, 6 x 9 inches; published by National Industrial Conference Board Inc.; and supplied by STEEL, Cleveland, for $3, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 15s, postage extra.

Rationalization of German industry is particularly significant at present because of its intimate connection with the problem of reparation, which it has been evoked to solve. The first part of this volume is devoted to discussion of the meaning, causes, methods and aims of the movement, as a background for the more detailed analysis of the German industrial structure that follows.

In the second part studies are made of five industries, coal, potash, iron and steel, electro-technical and chemi-

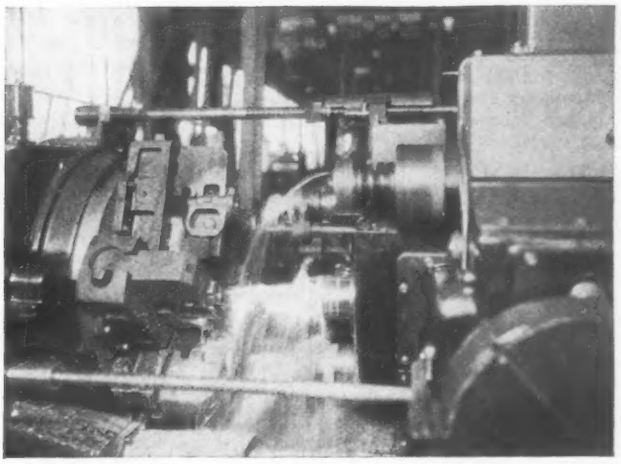
FINISH . . . LOWER COSTS *of metal or machines*

IN your own shop, SUNOCO Emulsifying Cutting Oil will:—

1. *Mix easily and stay mixed.*
2. *Be an ideal refrigerant as well as lubricant.*
3. *Act as perfect rust preventive.*
4. *Prevent system from clogging.*
5. *Require less frequent cleaning of the system.*
6. *Permit higher speeds and heavier cuts with better finish.*
7. *Never turn rancid, for it contains no animal or vegetable fats.*
8. *Prove to contain no rosin or rosin oil.*
9. *Keep workmen's hands in better condition.*

SUN OIL COMPANY ENGINEERS have offered many valuable suggestions at no cost to manufacturers for increasing outputs and lowering production costs. Prompt and intelligent attention is given to all inquiries addressed direct to Headquarters or to any of our branches.

SUN OIL COMPANY, Ltd., Montreal, Canada.



Courtesy of Warner Corporation, Muncie, Ind.

OPERATION: DRILLING, REAMING, SPOT FACING AND TAPPING STEERING GEAR CASES.
MACHINE: GOSS & DE LEEUW AUTOMATIC.
MATERIAL: MALLEABLE IRON.
SPINDLE SPEED: 200 R. P. M.
FEED: 240 FEET PER MINUTE.
TAP: 2 INCH DIAMETER, 16 PITCH.
PRODUCTION: 180 PIECES PER HOUR.
LUBRICANT: 1 PART SUNOCO TO 20 PARTS WATER.

Courtesy of Foote Bros., Gear and Machine Co., Chicago, Ill.

OPERATION: GRINDING GEAR BLANKS, 18 AT A TIME.
MACHINE: BLANCHARD SURFACE GRINDER, 26 INCH ONE-PIECE MAGNETIC CHUCK.
MATERIAL: SOFT STEEL.
WHEEL: NORTON SILICATE 16 INCH X 5 INCH X 1½ INCH.
WHEEL SPEED: 1000 R. P. M.
LUBRICANT: 1 PART SUNOCO TO 40 PARTS WATER.

OCO
CUTTING OIL
of BLUE SUNOCO MOTOR FUEL

JACKSONVILLE, MIAMI, MONTREAL, NEWARK, NEW YORK, OTTAWA, PHILADELPHIA, PITTSBURGH, PROVIDENCE, QUEBEC, QUINCY, READING, ROCHESTER, SCRANTON, SYRACUSE, TAMPA, TOLEDO, TORONTO, TRENTON, TULSA, WILMINGTON

cal. The final chapter discusses German foreign trade since the beginning of rationalization in 1924, to evaluate correctly the actual accomplishments that may make possible the exportable surplus essential for that country to discharge its various international obligations.

◆

What It Costs To Govern the United States

Cost of Government in the United States, 1928-1929, by National Industrial Conference Board Inc.; cloth, 159 pages, 6 x 9 inches; published by the board and supplied by STEEL, Cleveland, for $3, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 15s, postage extra.

This is the eighth volume in the series of annual reports prepared by the National Industrial Conference board on this subject and presents an analysis of the sources of the tremendous sum involved in federal, state and local governments. The total for the fiscal year ended in 1928 was $12,609,000,000, which is 3.5 per cent over 1927 and more than 300 per cent over 1913. The report also shows the purposes for which this sum was expended.

This brings down to date detailed factual information of tax revenues, borrowings and other fiscal operations of governmental units analyzed for earlier years in previous volumes. Public indebtedness is examined not only in respect to governmental units but to the purposes for which it was incurred.

◆

An Engineer Tells of His Life and Accomplishments

Autobiography of an Engineer, by William LeRoy Emmett, Sc.D.; cloth, 213 pages, 5½ x 8¼ inches; published by Fort Orange Press, Albany, N. Y.; supplied by STEEL, Cleveland, for $2, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 10s, postage extra.

Seldom does an engineer put into words the factors that have led him to his calling or tell of the influences that have brought him the success he may have achieved. The author of this account of his own life reveals in many naive sidelights much of the development of his genius and the guidance of circumstances that determined his path.

Aside from the insight thus given the book has value for the descriptions of his relations with Thomas A. Edison, Samuel Insull, E. W. Rice Jr. and other contemporaries. His philosophy of life and reasons for believing progress is better under private ownership than under a collective administration should stimulate much interest.

As one of the well-known quartet of General Electric creative engineers he had unusual opportunity to know intimately the inner workings of scientific advancement and the obstacles it meets. Elihu Thomson, Charles P. Steinmetz and Willis R. Whitney were the other three of the quartet referred to.

After graduating from the United States naval academy at Annapolis he saw active service as navigator in the Spanish-American war and then turned to engineering as a profession. He was a collaborator in the development of the steam turbine, was active in developing electric ship propulsion and in later years has spent much time in developing the mercury vapor turbine. The first unit of this form of power producer is in successful operation at the South Meadow station of the Hartford Electric Light Co., Hartford, Conn.

◆

Testing Materials Society Reports for 1930

Proceedings of American Society for Testing Materials, Vol. 30, two volumes; published by the society; supplied by STEEL, Cleveland, each volume at $6 in paper, $6.50 in cloth and $8 in half-leather binding, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 30s, 32s 6d and 40s, respectively per volume, postage additional.

Part I consists of 1336 pages and presents the annual reports for 1930 of 48 standing committees, research committees and four sectional and joint committees. Tables of data on chemical compositions, physical and mechanical properties and corrosion-resistant properties of corrosion-resistant and heat-resistant alloys are included.

Part II contains 1085 pages, giving 74 technical papers and discussions. These include the symposium on aircraft materials, 17 papers, and symposium on rosin and individual papers on nonferrous metals and other materials.

◆

How Budgetary Control Helps Manufacturing

Budgetary Control in Manufacturing Industry; by the National Industrial Conference Board Inc.; cloth, 180 pages, 6 x 9 inches; published by the board and supplied by STEEL, Cleveland, for $3, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 15s, postage extra.

Necessity for readjustment and stabilization in industry after the war has caused budgeting to come into use to a greater extent than ever before. In this brief period its development has been rapid and the present volume is the result of examination of its aims and methods to throw light on present trends in management.

The study is based on a survey of 288 manufacturing companies of the highest credit rating, with production of more than $100,000,000. The purpose of the study has been to determine the extent of adoption of budgetary control by the manufacturing industry and the results attained.

The report is brief and condensed and has much information of value to those planning or operating budgetary systems.

◆

Germans Trade Chemistry of Iron Combinations

Gmelins Handbuch der Anorganischen Chemie, eighth edition, *Eisen*, Part B. Sections 2 and 3; 200 and 144 pages respectively; paper, 7 x 10 inches; edited by the German Chemical Union, published by Verlag Chemie, G.m.b.H., Berlin, Germany; supplied by STEEL, Cleveland, for $8.50 and $6.50 respectively, plus 15 cents postage.

These two volumes are a continuation of a series on the chemistry of iron which form a part of Gmelins *Handbook of Inorganic Chemistry*, which has been reviewed previously. Part 2 deals with iron combined with bromine, iodine, sulphur, selenium, tellurium, boron, and carbon. Part 3 relates to iron acetate, oxolate, tartrate, cyanide, ferrocyanide, and ferricyanide. The main headings given hardly indicate the vast amount of information contained. In reality under the various headings, abstracts are presented from the world's literature relating to the subject.

◆

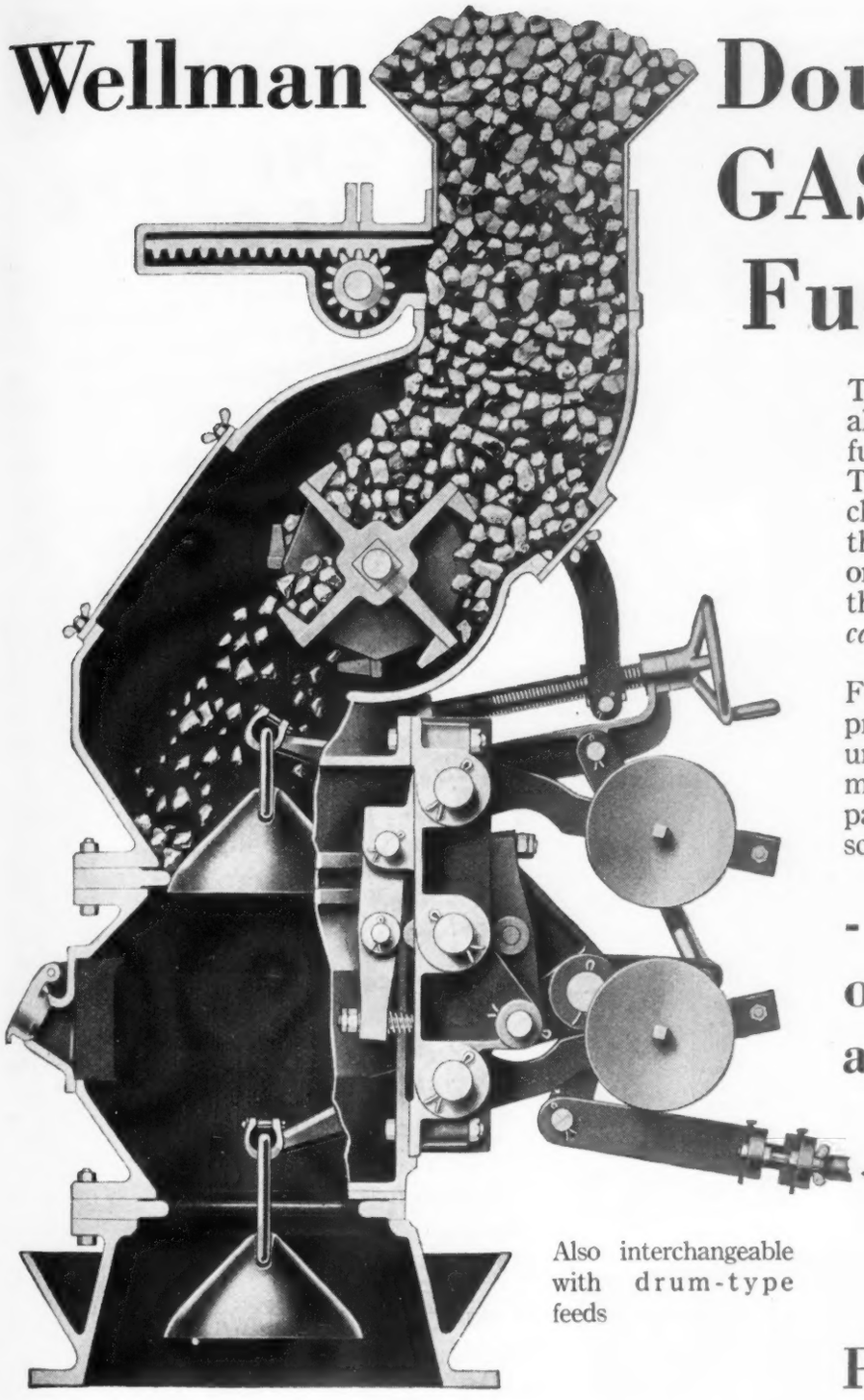
Making a Helpful Index

Indexing of Books and Periodicals, by John W. T. Walsh; cloth, 118 pages, 5 x 7½ inches; published by R. R. Bowker, New York; supplied by STEEL, Cleveland, for $2, plus 15 cents postage; in Europe by Penton Publishing Co. Ltd., Caxton House, London, for 10s, postage extra.

Because the making of an index to a book or a publication is difficult and often is ill done, the author wrote this brief treatise on the subject to aid others to escape the pitfalls and to point the way to better results.

Recognized rules for making an acceptable index that will guide the searcher to his goal are stated clearly and illustrated to make their meaning plain. Principles behind the practice are explained. To anyone charged with the task of indexing this manual will be of great assistance.

Wellman Double-Bell GAS TIGHT Fuel Feed



Two bells lower and raise alternately in passing the fuel into the gas producer. Their operation is mechanically automatic, and their action is so timed that one bell is open only when the other is closed—*no gas can escape.*

Fuel is fed into the gas producer with exceptional uniformity, and you get maximum gas making capacity without the need of screened coal.

---one of the outstanding advantages of

WELLMAN

GAS PRODUCERS

Also interchangeable with drum-type feeds

Write for our NEW BULLETIN No. 92

THE WELLMAN ENGINEERING CO.

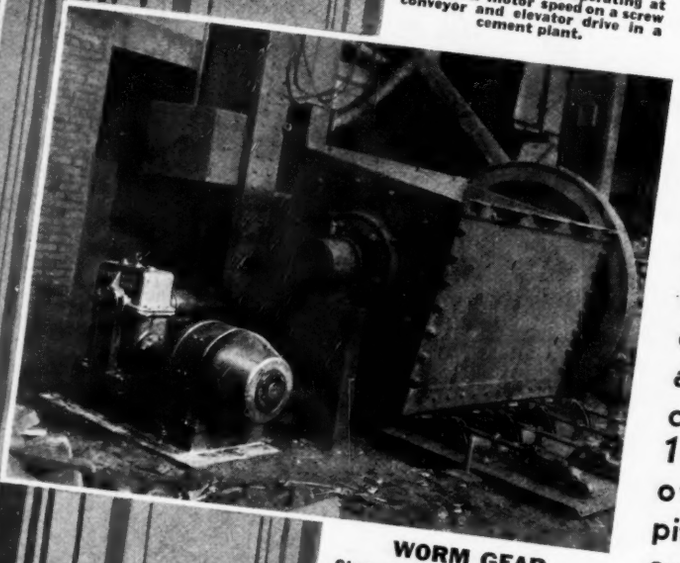
ENGINEERS CONSTRUCTORS MANUFACTURERS

CLEVELAND, OHIO

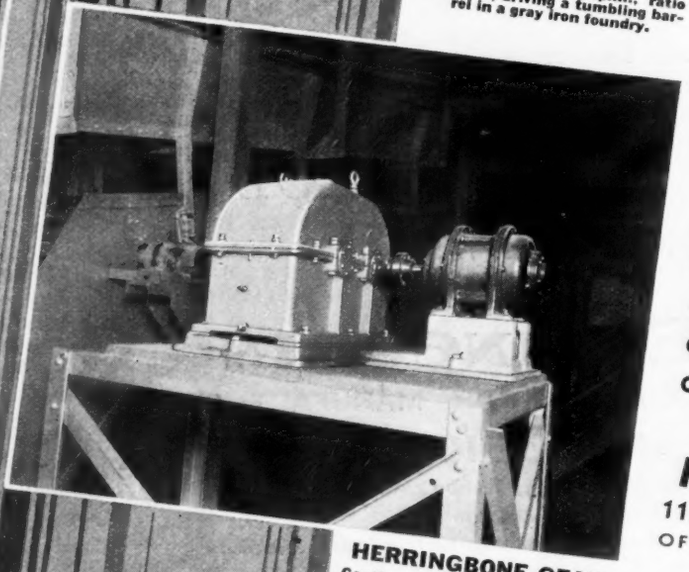
New York at 30 Church St., Birmingham at 1101 Webb Crawford Bldg.
Chicago at Room 523-549 West Washington Blvd.
"Canadian Wellman-Seaver-Morgan Co. Limited," 307 Reford Bldg., Toronto—821 Castle Bldg., Montreal
Mexico City at Edificio Oliver, 16 De Septiembre No. 5.

Formerly THE WELLMAN-SEAVER-MORGAN CO.

SPUR GEAR
Ideally Applied. A James Planetary Spur Gear Speed Reducer, 30 horsepower, ratio 64 to 1, operating at 900 r.p.m. motor speed on a screw conveyor and elevator drive in a cement plant.



WORM GEAR
Close Coupled. A James Heavy Duty Worm Gear Speed Reducer, 15 horsepower, 900 r.p.m., ratio 11.66 to 1, driving a tumbling barrel in a gray iron foundry.



HERRINGBONE GEAR
Continuous Service. A James No. 14LD Herringbone Speed Reducer, 25 horsepower, 1200 r.p.m., ratio 48 to 1, on a heavy duty drive in a West coast lumber mill.

ONE TYPE IS BEST!

Be sure that the speed reducer you buy is ideally suited to your conditions. *One type is best!* For high ratios of reduction the Planetary Spur Gear Type, for heavy duty, the Herringbone Gear Type, for average loads, the Worm Gear Type.

James makes them all—the correct speed reducer for *every* drive and in arrangements to drive up, down, horizontally or at right angles.

Demand a factor of safety of at least 3 to 1 and allowance for 25 per cent constant over-load and 100 per cent momentary over-load — standard pitch gears and all parts oversized — James guarantees this—other makers should.

If you do not have a copy of our Catalog No. 166, send for it today. It contains a complete treatise on speed reducers — all sizes, all types, weights, dimensions, horsepowers, etc. You should have a copy on hand always.

D. O. JAMES Manufacturing Co.
1120 W. Monroe St., Chicago
OFFICES IN PRINCIPAL CITIES

Come to Headquarters!
Make us your headquarters for cut gears and speed reducers. Our unequaled facilities and enormous stocks of finished speed reducer parts allow for quick shipment of many sizes. Only James makes all types of speed reducing units—the correct machine for every drive.

Scanning the Technology of Steel

A Digest of Important Developments in Scientific Research, Engineering Progress and Operating Procedure Pertaining to the Production, Processing, Application and Performance of Steel

Cottrell Process

Dust removal from industrial gases by electrical precipitation, discussed by C. W. Hedberg, in Proceedings Engineers' Society of Western Pennsylvania, February 1931, *p.* 63, 16½ *pp., 6 illusts.*

The present status of electric precipitation for cleaning blast furnace gas covers four distinct methods of application and installations utilizing each method now are operating in various parts of the world. The author discusses each method in detail and cites the various advantages. The method which will prove best for a particular plant is determined by local conditions such as possibility of heat conservation, water supply, disposal of the dust, cleanliness of the gas that is required and permissible operating costs. The open discussion of the author's paper contains valuable data in which various wet and dry systems of cleaning blast furnace gas are presented. This is followed by a detailed discussion of the changes in blast furnace design which have resulted in large pig iron production and which have effected economies in operating costs.

—STEEL, 5-7-31

Luminous Flame

Advantages obtained in different type furnaces by employing a luminous flame, enumerated by T. E. Wood, in Heat Treating and Forging, April 1931, *p.* 391, 2¾ *pp.*

A luminous flame is essentially a low-temperature flame because it radiates its heat as rapidly as combustion takes place. With the gases low in temperature, they are low in volume. With a more efficient rate of heat transfer a less volume of fuel is required to do the same amount of work. This accounts for open-hearth ports and checkers standing up under luminous flame operation. In pack heating furnaces using this type flame about 30 minutes is required to heat the conveying mechanism ready to receive the steel to be heated. Stickers are eliminated entirely when a luminous flame is employed. When normalizing furnaces are operated with a luminous flame the sheets come to identical temperatures throughout the corners or edges. The sheets leave the furnace with no more scale than when they entered. The author also discusses this type flame as applied to billet and forge heating furnaces, as well as terne pots.

—STEEL, 5-7-31

Arc Welded Joints

Development of arc welded joints in structural steel, by R. W. Van Kirk, General Electric Co.; a paper presented recently before a welding conference at Georgia School of Technology, Atlanta, Ga., 11 *pp., no illusts.*

Considerable attention and study are being given by steel manufacturing, fabrication and design industries to the use of electric arc welded joints in structural work. The author points out certain advantages which this type of structural work possesses, including reduction of noise during erection; saving in weight of steel; stronger connections, if desired; compact connections requiring less material than riveted connections; and the fact that welded joints will not work loose, resulting in a true, rigid framework.

A number of welded structures already erected are described, with specifications and account of the work. Permissible unit stresses, recomended electrode material, current values and significant points in design also are presented.

—STEEL, 5-7-31

Metal Strapping

A definite guide for selecting the proper size of metal bindings, presented by C. A. Plaskett, in the Purchasing Agent, April 1931, *p.* 316 3 *pp.,* 6 *charts.*

Various charts accompany the text and are based on the following premises: To give comparable results, the same cross sectional area and tensile strength are required of both round and flat straps. The value of round and flat straps increases with an increase in unit tensile strength of the strapping, but not in the same magnitude. Increasing the tensile strength of a nailess strap above four-thirds of the strength of its joint does not add to the value. The size of round and flat straps required varies as the square root of the weight of the box and its contents.

All the foregoing premises are in agreement with tests and have been approved by representatives of the strapping industry.

—STEEL, 5-7-31

Resistance Welding

Fundamental concepts in the art of resistance welding, discussed by C. L. Pfeiffer, in Journal of the American Welding society, April 1931, *p.* 4, 6½ *pp.,* 11 *illusts.*

The author deals with the concepts to assist in the determination of their applicability to specific problems in the design and manufacture of apparatus assemblies, machinery and other products. The text indicates the factors to be considered in adapting problems to certain fixed conditions. The welding of nonferrous materials is stressed because they are more difficult as a class to weld than the ferrous groups. A description of some interesting resistance welding processes in use at the Hawthorne plant, Western Electric Co. is included in discussion presented in the latter half of the paper.

—STEEL, 5-7-31

Terni Open Hearth

Principal characteristics of the Terni-type open-hearth furnace, presented in the Iron and Steel Industry (London), April 1931, *p.* 249, 2 *pp.,* 2 *illusts.*

The combustion chamber and the disposition of the ports in this type furnace have been arranged to give a high production per unit of time, low fuel consumption, a minimum of oxidation associated with high quality of product and a long life with no water cooling. The basic furnaces at the Terni works have a life of 1000 charges, comprising a complete campaign, before a general repair is made. With this type acid unit, steels frequently are made using 80 per cent of alloy scrap in the charge, containing 1.5 to 2 per cent chromium and from 3 to 4 per cent nickel. Charges of 50 tons are melted in about 7 hours and heats are tapped at intervals of from 11 to 13 hours.

—STEEL, 5-7-31

Machine Tools and Plant Equipment

«Without machine tools modern machinery could not be built.»
—Joseph W. Roe

Success in Fitting Machines to Men Marks Progressive Designers

A FACTOR of great importance in bringing about increased production and at the same time decreasing to a large degree the physical strain upon the operator, is the improved control which in one way or another is apparent on most of the new machine tools. In many cases, these improved control features can truly be described as the translation into mechanical form of the basic laws of effective co-ordination between men and machines which have been worked out during recent years by such industrial engineers as the late Frank B. Gilbreth and Dr. Lillian M. Gilbreth.

Location of controls on older types of machines obviously was determined by the anatomy of the machine, regardless of the anatomy of the operator. As dictated by mechanical expediency, levers, handwheels, ball cranks, belt shippers, etc., were scattered over the machine here, there and everywhere, regardless of the logical operating position. During the operating cycle it was necessary for the operator to reach, stoop, step to one side and even run around to the back of the machine, when the undivided attention of his mind should have been upon the work.

Steps in Control Design

Probably one of the first methods of refining machine control, other than the cut and try method of altering existing machines, was to lay the machine out full size on a vertical blackboard. By this means it was possible to stand before the machine before it was built—figuratively speaking—and get a fair idea of how it was going to feel to operate it.

As production demands increased, it became increasingly necessary to take the mechanical load off operators so that attention and physical strength would not be wastefully diverted. That led to grouping of mechanical controls more and more toward the operating center of the machine. With the introduction of electric drives it became possible to put the power control at the operator's finger tips, a condition which is becoming possible to a much higher degree with the introduction of unit motor drives to various parts of the machine. And now electrical control bids fair to eliminate levers, wheels and cranks and bring all operating functions under convenient finger tip control.

If any one thing may be said to stand out boldly as an obvious design trend in the multitude of new machines which now are being announced, it is this trend toward easy, convenient control. It is another manifestation of the importance of the human side of engineering, and proves that in the long run the machine must be made to fit the man if worker satisfaction and maximum production both are to be maintained.

◆

New Hydraulic Pumps Have Design Refinements

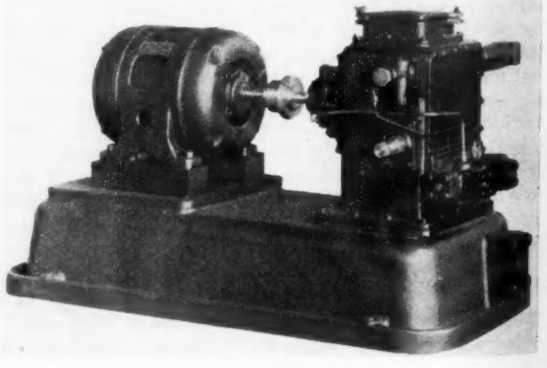
Oilgear Co., 647 Park street, Milwaukee, has brought out a new line of pumping units for use with hydraulically operated machine tools and other mechanisms requiring a steady flow of oil at high pressure. Among the uses to which these units can be applied successfully, the maker mentions honing machines, presses, die casting machines, and mechanisms for operating large furnace doors. One of these pumping units, mounted on a base with its driving motor, is shown in the accompanying illustration..

As compared to earlier units built by this company, this new line features an improved high pressure, variable delivery pump and improved pendulum assembly having direct suction. Maximum pressure can be maintained indefinitely without overheating or loss of power and without constant operating supervision. Pressure can be released instantly simply by bypassing the oil. A peak relief valve within the pump casing protects the work, machine and pump against overload.

Mechanical Features

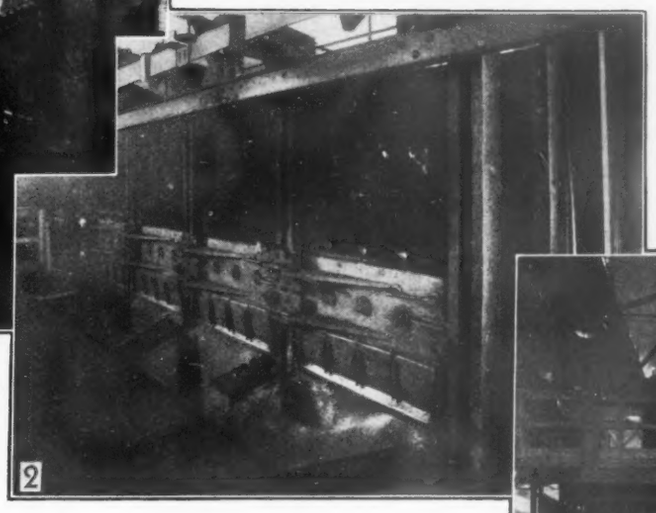
The top cover acts as a strainer and at the same time it serves as a breather. A small auxiliary gear pump, built into the drive shaft end casing, keeps the high pressure unit supercharged at all times. Thrusts are carried either on ball or roller bearings and all working parts are subjected to pressure lubrication. The high pressure pump is simple and compact and can be inspected readily while in operation.

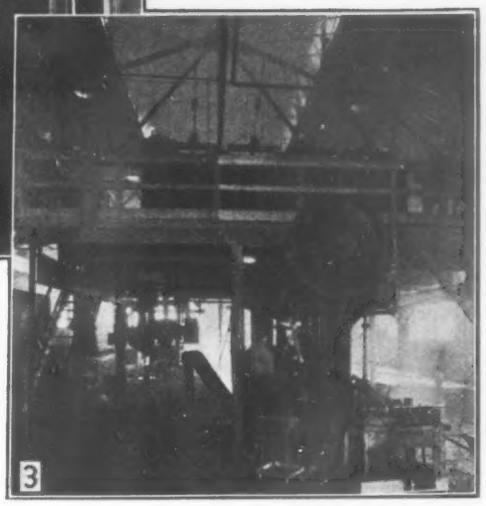
The units are furnished in three types, one of which has maximum displacement of 3600 cubic inches of oil per minute at 860 revolutions per minute constant speed, another of which has maximum displacement of 3400 cubic inches of oil per minute at 600 revolutions per minute constant speed, and a third of which has maximum displacement of 4800 cubic inches of oil per minute at 860 revolutions per minute. All will work con-



Pumping units for hydraulically operated mechanisms, improved by the Oilgear Co. to insure maximum freedom from pulsation, to maintain high average pressure, and to permit carrying of peak loads

THE CONTINUOUS FORGE FURNACE





This Continuous Process increased Production 25%, reduced costs and Greatly* IMPROVED *the quality of the product.

TWELVE lines of materials (as shown in No. 1) are automatically moved through the furnace and discharged at a rate of 40 to 70 pieces per min. through the flap covered chutes shown below the doors at the discharge end (photo No. 2) to the chute. The chute leads downward from the furnace located on the platform (photo No. 3) to a magazine from which the press is automatically fed.

The Costello Engineering Co. has done a considerable amount of such work, and our engineers will be glad to discuss with you its possibilities in your plant.

List of Products:

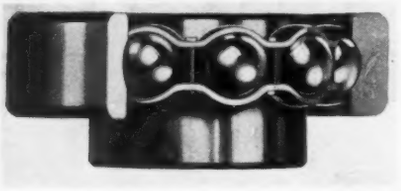
Continuous Pair and Sheet Furnaces
Continuous Pack Furnaces
Blue Annealing Furnaces
Box Annealing Furnaces
Car Type Annealing Furnaces
Normalizing Furnaces
Continuous Forge Furnaces
Furnaces for Special Requirements
Raw Producer Gas Burners

COSTELLO ENGINEERING CO.

519 OLIVER BUILDING **PITTSBURGH, PA., U.S.A.**

FURNACE DESIGNERS AND CONTRACTORS—ENGINEERING

Member of Industrial Furnace Manufacturers Association



Wide center ball bearing made by Standard Steel & Bearings Inc.

tinuously at maximum pressure of 1000 pounds per square inch, and in the case of the first two, peak pressures of 1500 pounds per square inch are available for short, intermittent operations. This is an important feature, as it does away with the necessity of expensive oversize units to meet occasional peak load conditions.

◆

Motorized Speed Reducers Have Double Shafts

Production Equipment Co., 5213 Windsor avenue, Cleveland, announces that any of its motorized speed reducers now can be supplied with shafts extended at both ends of the unit.

These motorized speed reducers consist of standard or special polyphase induction motors, mounted integral with spur, helical, planetary or bevel gears which are enclosed in oil tight housings. The low speed shaft from the speed reducer end of one of these units runs as slow as 20 revolutions per minute, or can be given a speed as high as 875 revolutions per minute. The shaft at the opposite end, direct from the motor, provides standard polyphase motor speeds of 1800, 1200, 900 or 720 revolutions per minute. For certain applications a unit can be supplied with, reducers at both ends, thereby giving opposite shaft speeds either alike or different, as conditions demand.

◆

Wide Ring Ball Bearing Eliminates Locknut

Standard Steel & Bearings Inc., Plainville, Conn., announces a variety of sizes of wide inner ring single-row ball bearings. A sectioned view of one of these bearings is shown herewith.

It is pointed out that the wide inner ring, corresponding in width to that of a standard double-row ball bearing of similar size, permits the use of the bearing without a locknut, thus effecting a considerable saving in the cost of assemblies. The maker recommends this type of bearing for use on electric motors and other mechanisms in which only a locating or nominal thrust is present.

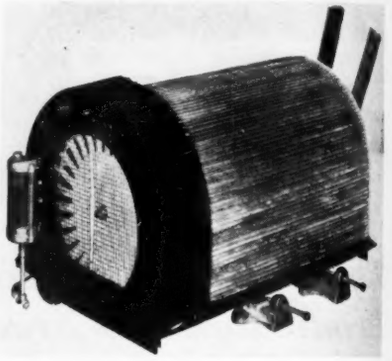
◆

Inclosure for Open Motors Protects at Low Cost

Daun-Walter Co., 508 North Water street, Milwaukee, has brought out an inclosure for open frame electric motors. This inclosure, which is shown in the accompanying illustration, effectively prevents accumulation of dust, moisture and other harmful substances on the motor.

Essentially, the inclosure consists of a corrugated copper case, with end walls and base plate of steel. At one end, a cooling fan and an outside combination of guard and air deflector, is provided. This cooling fan is driven direct by the motor shaft by means of a shaft adaptor which is easily coupled to the shaft end opposite the pulley end, without disturbing the motor. A large volume of air is driven over the deep copper fins of the casing thereby keeping the interior down to proper working temperature.

The heavy gage steel base allows mounting on motor slide rails, thereby taking care of belt adjustment. Vertically split construction of the casing makes it possible to open it completely in a few moments for motor inspection and repair. The inclosures are available for alternating current open frame motors, both two and three phase, in sizes ranging from 5 to 100 horsepower, as well as for direct current motors over the same power range. The manufacturer



Protective inclosure for open frame motors developed by Daun-Walter Co.

claims that open frame motors with these inclosures are considerably less expensive than totally inclosed type motors.

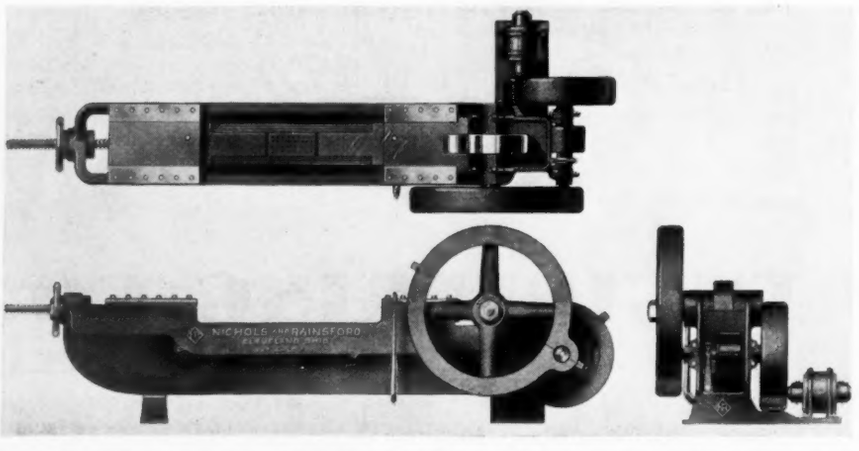
◆

Horizontal Press Has Wide Range of Usefulness

Nichols & Rainsford, Citizens building, Cleveland, announces a new design of horizontal press for the rapid performance of a wide variety of assembling, broaching, serrating, bending operations, etc. The accompanying illustration shows plan, elevation and end views of this machine.

The press is entirely mechanical in operation and control, and can be adjusted over a wide range and accurately positioned to press parts on to a definite distance and to perform other operations to close limits. The bed is of box design and is a chrome-nickel steel casting. V-ways provide positive alignment to the fixtures and special tools. The rams, which are gibbed to square ways, are accurately ground steel forgings to which fixtures are locked securely by quick removable wedge bolts.

The stationary ram is provided with a convenient screw and hand



Rugged horizontal press designed by Nichols & Rainsford for rapid performance of production operations, including forcing, bending, serrating and broaching

wheel for effecting longitudinal adjustment. Stroke of the moving ram is of fixed length, being given by a hardened and ground uniform motion disk cam on the mainshaft. This cam contacts with a large hardened and ground roller on the ram. Return stroke is by compression springs. The main shaft is of generous diameter and is of heat treated alloy steel, ground to size. Provision is made on this shaft for the attachment of various secondary mechanisms for operating fixtures.

Drive and Control

Double reduction gear drive is from a motor mounted on an extension of the base, through a backshaft at the head of the bed to a large gear on the mainshaft. Precise control is given throughout the stroke by an oil immersed clutch and brake unit mounted between the bearings of the backshaft. This unit is operated by a lever at the side of the machine, which can be moved readily to the most convenient operating position.

These machines can be furnished with beds designed to give distances between rams ranging from 24 to 96 inches, and to give operating pressures ranging from 25 to 100 tons. Among production applications the designer mentions: Assembling automobile rear axle housings, cross members, torque tubes, etc.; serrating cross tube ends; flanging exhaust pipes; and broaching blanks for sliding gears used in transmissions.

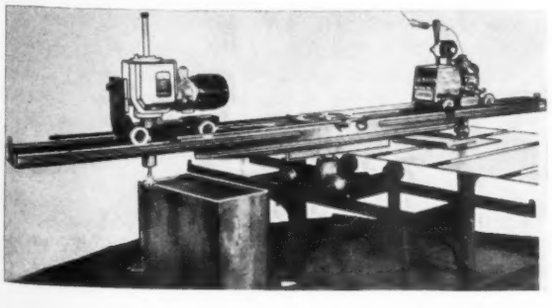
◆

Automatic Guiding Machine Speeds Arc Welding

General Welding & Equipment Co., Boston, has brought out a line of machines for automatically guiding arc welding heads over work either regular or irregular in outline. The accompanying illustration shows one of these machines operating around the end seam of a rectangular tank.

It is pointed out that work of this kind requires four different settings on a straight line welding machine, whereas in the case illustrated it is done with one simple setting. The method by which the welding head is controlled by a form, through the medium of an electrical control head, is shown rather clearly in the illustration at the foot of this page. The guiding templet is simple and inexpensive to make, and regardless of the irregularities of its shape, the control head follows its outline smoothly and accurately.

These tanks, which are made of 1/16-inch sheet steel, are welded at the rate of 25 lineal inches per minute.

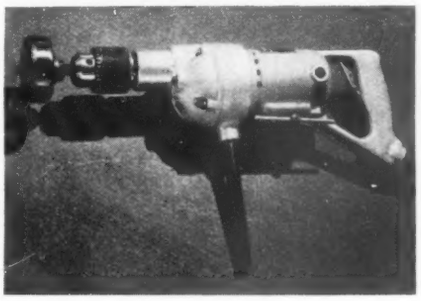


This automatic machine, which uses templets to guide an arc welding head around regular or irregular work, was designed by General Welding & Equipment Co.

◆

Slow Speed Portable Drill Has Unusual Power

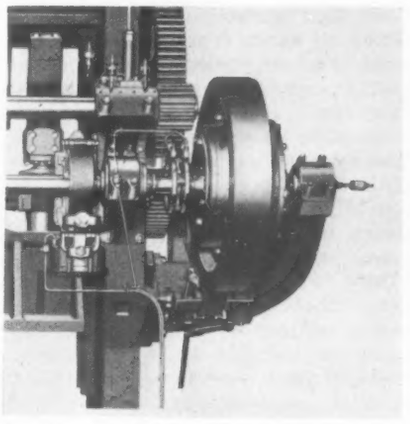
Wappat Inc., 7522 Meade street, Pittsburgh, has developed a slow speed portable electric drill which is recommended for drilling unusually hard metals and for driving hole saws up to 3 inches in diameter. One of these tools, equipped with a hole saw, is shown in the accompanying illustration.



Unusually powerful slow speed electric drill developed by Wappat Inc.

In spite of its power, the tool is relatively light in weight. The front bearing of the spindle is of the combined radial and thrust ball type. Gears are of heat treated alloy steel and run in grease in a sealed chamber. Sealed ball bearings on the armature shaft prevent seepage of grease into the motor.

The drill makes 200 revolutions per minute and the maker claims that it cannot be stalled by any hand drilling test. It has a net weight of 10 pounds.



Section of head of Bliss press, showing electromagnetic control

◆

Magnetic Control Adapted to Punch Presses

E. W. Bliss Co., Fifty-third street and Second avenue, Brooklyn, N. Y., has adapted magnetic control to multiple disk friction clutches and brakes used on power driven punch presses. The accompanying illustration shows such an application.

While the clutch is of the conventional multiple plate type, all operating links and levers are eliminated, the magnetic pull being exerted directly upon the moving plate without thrust on any bearing. Adjustment is made by means of a single threaded ring at the back of the friction plates. The visible air gap of the magnet is a distinct advantage. The specially wound magnetic brake is of the type used with manipulator and crane motors.

Operating Advantages

The equipment gives full automatic control, and in addition furnishes a definite safeguard even when two or more operators are employed on one machine. A four-station transfer switch is mounted on the side of the press, two start buttons and one emergency stop button being provided for each operator. These buttons have special covers which enable workers wearing heavy gloves to operate them with the heel of the hand. Being of the "locked in" type, any number of the buttons can be closed when all operators are not employed. A foot switch also can be provided for operation with all buttons locked in.

The four-station transfer switch al-

lows four working conditions. First, when all hands depress the start buttons and then are removed the clutch will engage, causing the press to make one cycle, stopping automatically with slide at top stroke. Second, the press can be made to run continuously until stopped by depressing any one of the stop buttons, this method being used when operators can time their work to catch every stroke. Third, by depressing a special button, "inching" can be accomplished when setting dies, the press in this case running only while the button is held down. Fourth, by means of a special cam mechanism, automatic top stop, requiring sustained hold on all the start buttons, can be attained, this being recommended in the case of slow running presses on which operators are tempted to adjust work on the die after the slide starts down, which naturally is a practice involving serious danger.

Direct current is required to operate this control. The panel carrying relays and resistors for the clutch and brake magnets can be mounted in any convenient position.

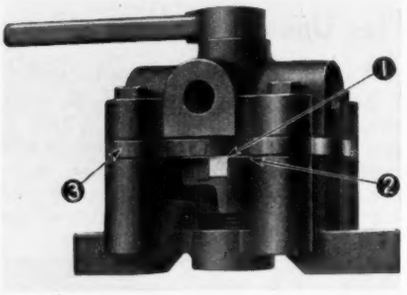
◆

New Design of Valve Cuts Maintenance Cost

Norin Engineering Co., 355 North Union Park court, Chicago, announces a new type of valve for use with air, steam, water, oil, gasoline, gas, etc. These valves resist leakage and wear, and can be renewed easily and at low cost. One of them is shown in the accompanying illustration, with principal parts carrying reference numbers, 1 being a bronze valve disk, 2 a soft resilient disk and 3 a bronze valve seat.

Even surface pressure is maintained by the resilient disk, which serves to equalize surface pressure on the bronze disk and bronze plate, thus assuring tightness. The bronze to bronze contact between disk and plate eliminates corrosive wearing.

The three numbered parts, while subject to less than ordinary wear, eventually require replacement. They are interchangeable and can be replaced in less than three minutes simply by removing four small screws, this allowing complete disassembly. Upon replacement of these parts,



Valve developed by Norin Engineering Co. eliminates corrosive wearing

which constitute only a fraction of the cost of the complete assembly, the valve becomes again as good as new.

◆

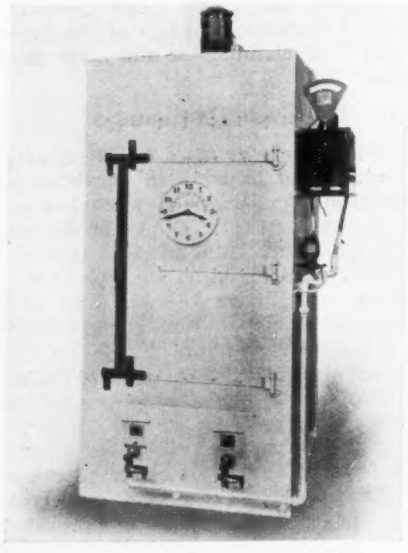
Gas Fired Air-Draw Oven Has Thermostat Control

Despatch Oven Co., 622 Ninth street, southeast, Minneapolis, is marketing a gas heated recirculating air drawing oven. This oven, shown in the accompanying illustration, is designed for all low temperature heat treating and tempering operations requiring temperatures not exceeding 800 degrees Fahr.

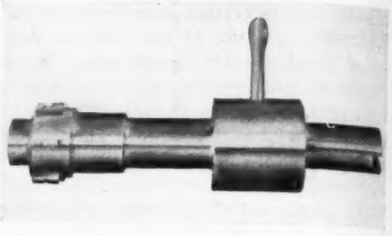
The cabinet is of the double wall type, with structural steel reinforcing members, covered with heavy steel plates. Insulation between the walls is 5 inches thick. Within the inner wall, and separated from it by an air space, is the lining of the working chamber, in effect a third wall. This forms a baffle so that the heated air generated in the combustion chamber must rise to the top of the oven before entering the working chamber.

At the top of the cabinet is a vertical motor driven fan unit which accelerates the upward flow of heated air and then forces it down upon the parts to be treated. This eliminates dead air pockets and insures uniform heat treatment. The hot air passes out of the working chamber through slots near the bottom on each side, to become again thoroughly mixed with the up-current and recirculated. The maker claims a heat loss of only 5 or 10 degrees per cycle, which means gas economy.

The working chamber of the standard oven is 2 feet wide, 3 feet deep and 4 feet high. Special ovens can be furnished in other capacities. A vapor tension thermostatic system of control, which can be adjusted easily for proper operating temperature, relieves the operator of constant temperature regulation. The thermostat operates in conjunction with a relay and motor driven valve in the gas supply line.



Air drawing furnace of Despatch Oven Co. uses recirculation for economy



Special Landis collapsing tap overcomes difficulty in tapping gate valves

◆

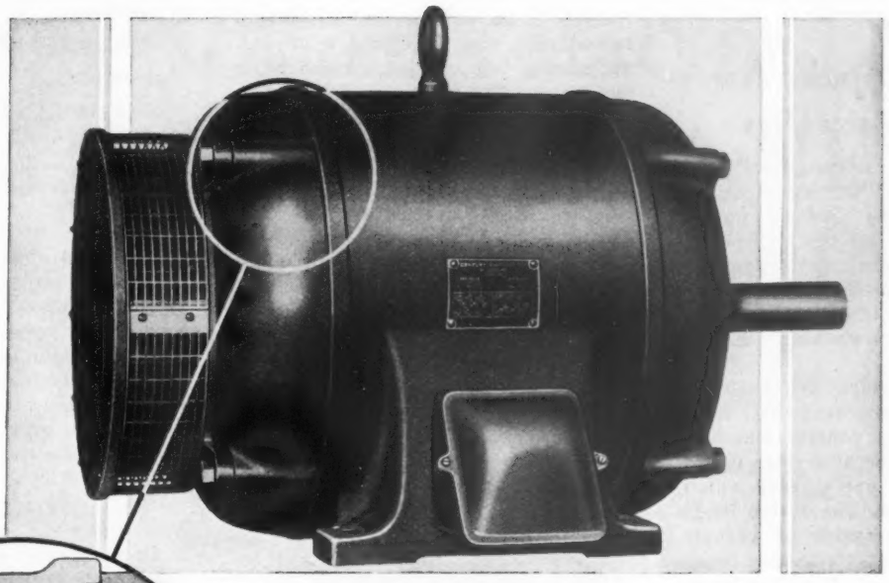
Special Tap Developed for Valve Seat Ring Threads

Landis Machine Co. Inc., Waynesboro, Pa., has placed on the market a collapsing chaser tap designed to cut the valve seat ring threads in gate valves. One of these taps is shown in the illustration appearing at the top of this column, in which the chasers are shown in cutting position.

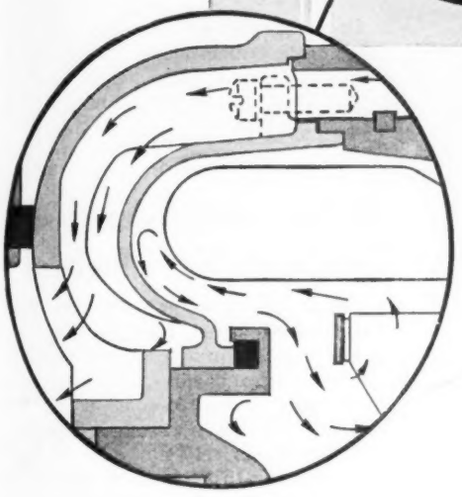
Since the major diameters of these threads are greater than the port openings, the cutting of them is a difficult problem with any ordinary tools. To meet this situation, this new tap is equipped with double ended chasers, one end for each of the two valve seat ring threads, the collapsed diameter of these chasers being such that they clear the port openings. These chasers are reset when they are within the body of the valve, just before reaching the start of their cut.

The chasers are expanded to cutting position by means of a handle which is operated after the tap has been introduced into the valve body through one of the port openings. The double end chasers enable both threads to be cut at one chucking. The tap is suitable for use on valves with either parallel or angle seats. Those with angle seats require a

THEY KEEP A-RUNNING



100 Horse Power Century Totally-Enclosed Fan-Cooled Squirrel Cage Induction 3 and 2 Phase Constant Speed Continuous-Duty Motor



Cross sectional view illustrating one feature of Century Totally-Enclosed Fan-Cooled Motor construction. Note especially the rabbet joints between the outer motor casing and the bearing bracket and between the stator shell and the coil guard.

TOTALLY-ENCLOSED FAN-COOLED MOTORS

PROTECTED against dirt, moisture, and all foreign particles. CENTURY Totally-Enclosed Fan-Cooled windings and all vital parts are completely isolated from the outside air by ribbed cast iron enclosures—a very desirable feature for installations in machine shops, foundries, boiler rooms, cereal plants, chemical plants, packing plants, wood shops, textile plants and dyehouses.

Century Squirrel Cage Polyphase Induction Motors are built in standard sizes from ¼ to 250 horse power.

CENTURY ELECTRIC COMPANY

1806 PINE ST. · · ST. LOUIS, MO.

40 U. S. and Canadian Stock Points and More Than 75 Outside Thereof

SINGLE PHASE, THREE PHASE, AND DIRECT CURRENT MOTORS

Century MOTORS

MOTOR GENERATOR SETS, ROTARY CONVERTORS, FANS AND VENTILATORS

10-3-100

FOR MORE THAN 27 YEARS AT ST. LOUIS

trunnion type fixture with stops located to bring the seat ring openings accurately in line with the tool.

◆

Small Electric Trucks Are Efficient for Many Uses

Custer Specialty Co. Inc., 119 Franklin street, Dayton, O., announces a line of electrically driven utility trucks designed to fill the transportation gap between the hand truck and the ordinary industrial truck of power driven type. One of these trucks is shown in the accompanying illustration.

These trucks, which are built in 400 and 800-pound capacities, have flat platforms with control standard at one end. The operator rides on an overhanging shelf, one side of which forms a foot control. The design lends itself to the attachment of various kinds of bins, shop maintenance tools, etc. It likewise permits the attachment of mowing, rolling, sweeping, snow plowing and other units for outdoor use. Wide tread tires can be furnished to permit use on soft surfaces.

The smaller model has a 29 x 70½-inch platform, and weighs 600 pounds. The larger model has a 33½ x 70½-inch platform, and weighs 900 pounds.

◆

Feature of New Lathe Line Is Underneath Drive

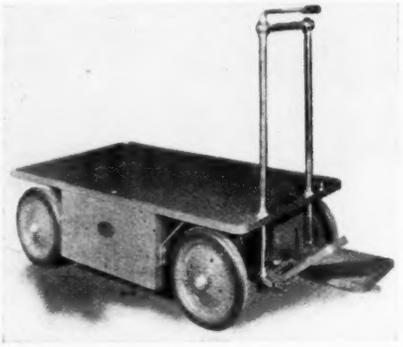
South Bend Lathe Works, 426 East Madison street, South Bend, Ind., has put on the market a new line of lathes of the underneath belt, motor driven type. These lathes, which are of the back geared screw cutting type, are recommended by the maker for production manufacturing as well as for precision tool work. They are built in sizes ranging from 9 to 18-inch swing, with bed lengths from 2½ to 14 feet. One of these machines is shown in the accompanying illustration.

Each lathe constitutes a self-contained unit, the individual motor being housed in a cabinet leg under the headstock. The motor is connected to a jackshaft by two adjustable V-belts, and flat belt—likewise readily adjustable—runs from a driving cone on this jackshaft to a mating cone on the spindle. Eight speeds are provided by the four cone steps and back gears..

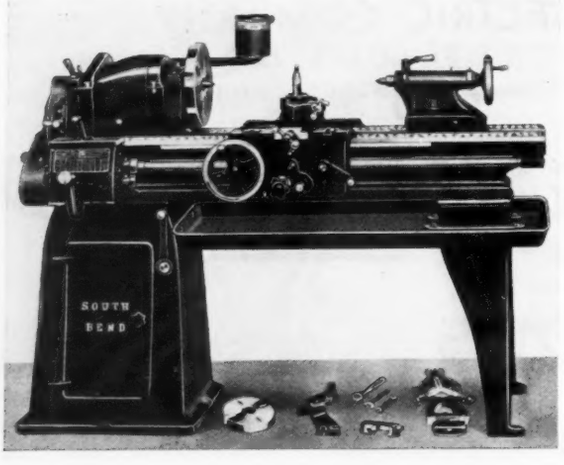
Besides giving the conveniences and freedom of location of individual unit motor drive, this system gives clear vision and freedom from overhead obstructions. There are no exposed belts, pulleys or gears, and the tension of the flat drive belt is instantly adjustable to suit working conditions, this being accomplished by a cam in the cabinet leg, located directly back of the belt adjusting lever. The machine is started, stopped and reversed by a drum type switch, mounted on a support convenient to the operator.

The bed is of rigid design, thoroughly cross-ribbed, and is cast of a mixture containing 50 per cent steel and a small amount of nickel, which insures a hard, close grained metal. The headstock, which also is thoroughly ribbed and braced, is bolted directly to long, hand scraped bearings on the bed. The spindle, which is machined from a solid bar of chrome-nickel steel, is hollow, and after being hardened, is ground all over, this including the socket in the nose. Phosphor bronze or cast iron bearings are optional.

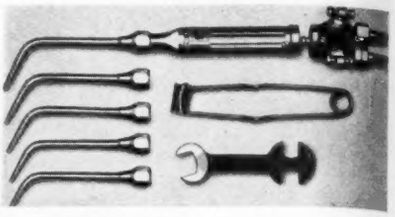
Other improvements include; graduated tailstick spindle, rigid double walled apron with steel gears running in oil bath, multiple disk oil immersed feed clutch, and single knob control both to automatic longitudinal feed and cross feed.



Custer electric truck meets demands for intermediate conveyance



Overhead incumbrances are eliminated, and increased convenience of control is given, to this South Bend precision manufacturing lathe, by an efficient and compact unit electrical drive housed within a cabinet leg



New Linde welding blowpipe featuring quick detachable valve body

◆

Welding Blowpipes Have Detachable Valve Bodies

Linde Air Products Co., 30 East Forty-second street, New York, recently added to its line of medium pressure gas welding apparatus, two new blow pipe sets. These sets, of which the smallest size is illustrated herewith, embody an entirely new idea in blow pipe design, this being a detachable valve body to which the handle is secured by a simple and convenient locking device. This improvement enables the operator to change quickly from the standard handle to handles of other types, without having to detach the hose or hose connections, and without the use of a wrench.

Both the large and small sets are designed to make use of the latest type of one-piece, hard-drawn, copper tips. Although regularly supplied with a head angle of 60 degrees, this can be changed by the user to any desired angle. Ten different sizes of tips, numbers 4 to 13, inclusive, are available for use with the large size handle. This standard set includes tips numbers 4, 6, 8, 10 and 12. There also is available a stem adaptor by means of which tips of the aircraft type blowpipe, described in a recent issue of STEEL, can be used, thereby making the new blowpipes useful on thin sheet metal work.

The smaller set, which is identical in design to the larger one, includes five sizes of tips, numbers 3 to 7.

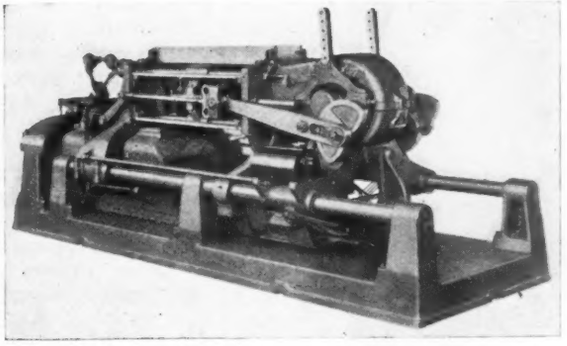
THE JOHNSON FRICTION CLUTCH

IS BEING USED AS A

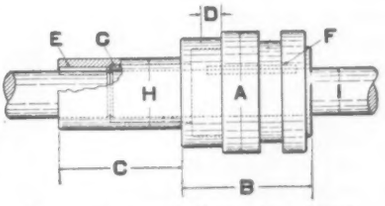
PART OF THIS MACHINE:

MADISON-KI P'S NEW DIE CASTING MACHINE

(SIZE No. 4 12"x16")



Courtesy Madison-Kipp Corp., Madison, Wis.



No. 6 Single Cut-Off Coupling Clutch

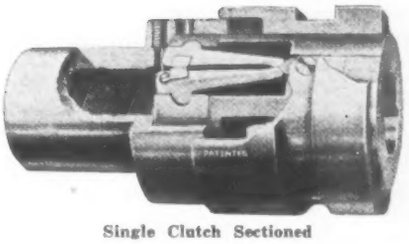
The *Johnson* Clutch gives "exact" clutch power transmission on Die Casting Machines. *Johnson's* start the machine instantly, operate it smoothly and stop it quickly.

On this large 12,000 lb. Die Casting Machine a No. 6 Special Single JOHNSON Friction Clutch, transmitting 2 to 3 horsepower at 600 R.P.M. is located above and to the right of the driving motor. The Clutch is a one-way cut-off coupling, connecting the driving motor to the power receiving end of the machine. This JOHNSON Clutch is operated by hand approximately 2000 times per day.

Single Cut-Off Coupling Clutch Used.

Use The SUPER-JOHNSON on

machines subject to high clutch speeds, heavy starting loads, where excessive slipping is encountered and for excessive engaging per hour or day.



Single Clutch Sectioned

SEND FOR CATALOG "WHITE—5"

THE CARLYLE JOHNSON MACHINE CO. MANCHESTER CONN.

Personals

(*Concluded from Page* 31)

transferred to the company's engineering department at Pittsburgh.

□ □ □

Walter R. Collins and David G. Jones of the Carnegie Steel Co., Youngstown, O., were retired May 1 on pensions.

□ □ □

John Winkler, formerly with Cleveland Enameling Mfg. Co., Cleveland, now has charge of porcelain enameling operations at Youngstown Pressed Steel Co., Warren, O.

□ □ □

Willis D. Gradison, of Cincinnati, has been elected a director of National Pumps Corp., Chicago, to fill the vacancy caused by the resignation of Murray Smith. Mr. Smith remains as counsel for the company.

□ □ □

Frank B. Bell, president, Edgewater Steel Co., Oakmont, Pa., and Harry M. Naugle of Canton, O., have been elected directors of the United Engineering & Foundry Co., Pittsburgh, to fill vacancies on the board.

□ □ □

George W. Wiard has been appointed Detroit representative for Walker Mfg. Co., Racine, Wis., automotive jacks, etc. He will be connected with the original equipment division.

□ □ □

J. P. Warner has been appointed district manager at Wichita, Kans., for Colorado Fuel & Iron Co., Pueblo, Colo. He succeeds T. D. Fahey, who resigned recently to become head of Wichita Fence & Supply Co., Wichita.

□ □ □

George F. Rummel, who retired May 1 from American Steel & Wire Co., Cleveland, has been doing special work for the past two years but for 26 years previously was assistant general manager of sales.

□ □ □

Fred L. Flanders, formerly chairman of the Muskegon Motors Specialties Co., Muskegon, Mich., subsidiary of Houdaille-Hershey Corp., Detroit, has been elected executive vice president and general manager of the parent company.

□ □ □

H. J. Philip has resigned as manager of South Market street plant, Brantford, Ont., of the Massey-Harris Co., Toronto, Ont.

C. F. Verity of the Verity Plow Works division of the same company also has resigned.

□ □ □

H. M. Pierce now is associated with the Detroit office at 1911-12 Fisher building, of Newton Steel Co., Youngstown, O., and Monroe, Mich.

J. Fred Mehlhope now is associated with the Chicago district sales office at 724 Straus building.

□ □ □

Ralph J. Miars, who has been with the Champion Bridge Works, Wilmington, O., steel fabricator, since 1913, has been elected secretary-treasurer and general manager. He succeeds Robert L. Owens, resigned on account of illness.

□ □ □

Frederick A. Oefinger of Emaus, Pa., was recently elected president of Plantsville Foundry Corp., Southington, Conn., making gray iron castings. He succeeds Thomas W. Thompson. The company has not been operating for a year but now will resume.

□ □ □

Julius Muller, formerly with Henry Vogt Machine Co., Louisville, Ky., now is development engineer for Leeds & Northrup Co., Philadelphia.

F. W. Miller

Who as noted in STEEL of April 30 resigned recently as vice president of Rogers Brown & Crocker Bros. Inc., Cincinnati, to become vice president of Swann Chemical Co., Cincinnati, in charge of ferro phosphorus sales

□ □ □

Edward L. Forstner, for 14 years associated with David Lupton's Sons Co., Philadelphia, has been elected president. He succeeds David D. Lupton, who becomes chairman. H. C. Grubbs, formerly vice president in charge of sales of R. C. A.-Victor Inc., was elected executive vice president.

□ □ □

James L. Mahon, superintendent of American Car & Foundry Co., Detroit, was elected president of Detroit Foundrymen's association at the April 16 annual meeting. Other officers elected are: Peter W. Mulder, vice president; Neil McArthur, secretary, and Fred A. Cowen, treasurer. The following were elected directors: Clarence H. Miller, Leslie G. Korte, Russell M. Scott, Vaughan Reid, Harry Rayner, and Fred J. Walls.

□ □ □

Edward D. Boyer has retired as technical service manager of the New York office of Universal Atlas Cement Co., Chicago, a subsidiary of the United States Steel Corp. He has been succeeded by E. K. Borchard, technical service engineer, also of New York, who joined the Atlas organization in 1917. Mr. Boyer is a director and former president of American Concrete institute and formerly was director of the American Society for Testing Materials.

□ □ □

M. B. MacNeille has resigned from Fairbanks, Morse & Co., Chicago, to become western sales manager with headquarters in San Francisco, of Dayton-Dowd Co., Quincy, Ill., manufacturer of centrifugal pumps. Mr. MacNeille has been for 19 years with the pump division of Fairbanks, Morse & Co., starting as designing engineer on centrifugal pumps. For the past six years he was manager of the pump division and previous to that he was chief engineer of the hydraulic division.

□ □ □

R. E. Affantranger, of the Vichek Tool Co., Cleveland, was elected president of the Purchasing Agents' Association of Cleveland, at a recent meeting. Other officers elected are: J. M. McKenzie, West Steel Castings Co., Cleveland, vice president; G. A. Collier, Cleveland Automatic Machine Co., secretary, and R. C. Donley of Donley Bros. Co., treasurer. These officers with the following were elected trustees: R. G. Sweeney, Allyne-Ryan Foundry Co., H. H. Krause, National Screw & Mfg. Co.; R. M. Griswold, Gears & Forgings Inc., K. C. Ferguson, H. K. Ferguson Co.; and H. E. Boppel, Cleveland board of education.

□ □ □

S. M. Kintner, assistant vice president of the Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has been elected vice president in charge of engineering. He succeeds W. S. Rugg who has been promoted to the office of vice president in charge of sales.

Charles A. Terry, formerly vice president, was elected honorary vice president.

Frank Thornton Jr., manager of resident engineers in the general engineering department of the Westinghouse company, has been appointed manager of association activities of the engineering department. He succeeds R.W.E. Moore, resigned.

John M. Lessells, formerly manager of the mechanics division of the research laboratory at East Pittsburgh, has been appointed manager of engineering in the South Philadelphia works. He succeeds A. D. Hunt, resigned.

Pig Iron Rate Up but Stacks Go Out

Steel Demand Continues To Subside—Operations Off Another Point—Prices Giving Ground Slowly—More Interest Shown in Primary Rail Requirements

PIG iron production in April carried through to a higher daily rate than in March, mainly on its momentum, as the month closed with active stacks reduced by two to 114. It was the fourth consecutive monthly increase in daily output, though the gain—2.4 per cent—is the smallest for any of the four months this year. It is significant that this is the first instance in the same period when fewer stacks were in blast at the close of a month than at the beginning.

Actual daily output in April was 67,017 gross tons. For the month the total was 2,010,534 tons, a loss of 18,372 tons from the aggregate for March. Output to May 1 this year—7,466,075 tons—is down 38.4 per cent from the comparable period in 1930.

It is doubtful if statistics for April steel ingot production will show an increase over March. Steel requirements have continued to decline slowly, as if near bedrock. The rate of output, keyed more flexibly to current demand than is that of blast furnace operation to requirements, has fallen off to 48 per cent, compared with 49-50 per cent last week.

Specifications from the automotive industry have changed little. Chevrolet is increasing its output and orders for steel; Ford operations continue to decline. Variations among other automobile manufacturers about cancel out. It now appears to be a contest to determine if Chevrolet's improvement will counterbalance the Ford loss.

Railroads display more interest in rail requirements but this demand represents primary buying for the year. So far there is no evidence of secondary buying which normally develops before midyear. The Missouri Pacific has placed 15,000 tons, but the St. Paul has yet to close for 23,000 tons.

Building construction gives little evidence of immediate improvement. In the East there has been a decline in new jobs. New inquiries for structural steel this week amount to approximately 13,000 tons, compared with 35,000 tons a week ago. Actual awards for the week total 22,690 tons, compared with 25,502 tons in the preceding week, and 61,464 tons in the week last year. Awards to date this year, 780,479 tons, continue well ahead of the 633,019 tons in the period of 1930.

Line pipe projects are not developing as well as expected, due to difficulties in financing. Promoters of several important projects have been unable to obtain the necessary backing, and pipe mills are unwilling to participate in financing.

A few bright spots are noted in the market, principally at Chicago. Demand for steel bars in the past week in the Middle West was equal to the best week of the year, due largely to automotive and highway needs. Nails are more active at Chicago, as are hot strip specifications. Prospects for tank work in the East Texas field are more promising.

Scrap prices show further recession, with an interesting development at Chicago where steel mills are increasing their melt of scrap, piling their pig iron or banking their furnaces. There are two reasons for this: First, low prices of scrap, and second, steel producers do not want to see the demoralization of the market go too far.

Prices of heavy finished steel are largely untested, though under some pressure, but sheets and strip manifest more weakness, and cast iron pipe quotations are soft. Contract obligations for sheets for second quarter are leading many producers to defer adoption of the new classification schedules until the third quarter.

Foundries continue to purchase pig iron on a month to month basis. April shipments were about equal to those of March. Furnace stocks have increased, and shipments could be stepped up 10 to 20 per cent without advancing output. By-product foundry coke has been reduced 50 cents in the Chicago district.

Due to some adjustments in pig iron prices STEEL's price composite this week is down 9 cents to $31.40, a new post-war low.

Composite Market Averages

Based on Pig Iron, Billets, Slabs, Sheet Bars, Wire Rods, Steel Bars, Plates, Shapes, Black, Galvanized and Blue Annealed Sheets, Tin Plate, Wire Nails and Black Pipe.

This week (May 6, 1931)	**$31.40**
Last week (April 29, 1931)	**31.49**
One month ago (April, 1931)	**31.59**
Three months ago (February, 1931)	**31.65**
One year ago (May, 1930)	**33.73**
Ten years ago (May, 1921)	**43.32**

Comparative Prices of Iron, Steel and Coke

Representative Market Figures for This Week, Last Month, Three Months and One Year Ago

	May 6, 1931	April 1931	Feb. 1931	May 1930
PIG IRON				
Bessemer, del. Pittsburgh	$18.26	18.26	18.51	20.76
Basic, valley	17.00	17.00	16.75	18.50
Basic, eastern del. eastern Pa.	17.25	17.25	17.25	18.75
No. 2 foundry, del. Pittsburgh	18.26	18.26	18.01	19.76
No. 2 foundry, Chicago	17.50	17.50	17.50	19.00
*Southern No. 2, Birmingham	12.00	13.00	13.00	14.00
**No. 2X, Virginia furnace	18.25	18.25	18.25	18.25
**No. 2X, Eastern del., Phila.	17.76	18.26	18.26	20.26
Malleable, valley	17.00	17.00	17.25	19.00
Malleable, Chicago	17.50	17.50	17.50	19.00
Lake Superior, charcoal, del. Chi.	27.04	27.04	27.04	27.04
Gray forge, del. Pittsburgh	17.63	17.63	17.38	19.13
Ferromanganese, del. Pittsburgh	89.79	89.79	89.79	103.79

*1.75 to 2.25 silicon. For local delivery. Northern shipments based on $11, Birmingham. **2.25 to 2.75 silicon.

COKE				
Connellsville furnace, ovens	2.50	2.50	2.50	2.55
Connellsville foundry, ovens	3.25	3.25	3.25	3.50
SEMIFINISHED MATERIAL				
Sheet bars, open-hearth, Youngs.	30.00	30.00	30.00	32.20
Sheet bars, open-hearth, Pitts.	30.00	30.00	30.00	32.20
Billets, open-hearth, Pittsburgh	30.00	30.00	30.00	32.20
Wire rods, Pittsburgh	35.00	36.00	35.00	36.40

	May 6, 1931	April 1931	Feb. 1931	May 1930
FINISHED MATERIAL				
Steel bars, Pittsburgh	1.65	1.65	1.65	1.75
Steel bars, Chicago	1.75	1.80	1.70	1.85
Steel bars, Philadelphia	1.94	1.96	1.94	2.04
Iron bars, Chicago	1.80	1.80	1.75	1.90
Shapes, Pittsburgh	1.65	1.65	1.60	1.75
Shapes, Philadelphia	1.81	1.78	1.81	1.76
Shapes, Chicago	1.75	1.80	1.70	1.85
Tank plates, Pittsburgh	1.65	1.65	1.65	1.75
Tank plates, Philadelphia	1.85½	1.85½	1.80½	1.90½
Tank plates, Chicago	1.75	1.80	1.70	1.85
Sheets, blue anl., No. 13, Pitts.	2.00	2.00	2.05	2.15
Sheets, black, No. 24, Pitts.	2.25	2.25	2.35	2.55
Sheets, gal., No. 24, Pittsburgh	2.80	2.85	2.90	3.25
Sheets, black, No. 24, Chicago	2.40	2.45	2.50	2.70
Sheets, blue anl., No. 13, Chicago	2.15	2.20	2.20	2.35
Sheets, galvanized, No. 24, Chi.	2.95	3.00	3.05	3.35
Plain wire, Pittsburgh	2.20	2.20	2.20	2.35
Wire nails, Pittsburgh	1.90	1.90	1.90	2.15
Tin plate, per base box, Pitts.	5.00	5.00	5.00	5.25
SCRAP				
Heavy melting steel, Pitts.	11.50	12.50	12.75	15.40
Heavy melting steel, eastern Pa.	10.00	10.00	10.50	13.40
Heavy melting steel, Chicago	9.25	9.60	9.85	12.55
No. 1 wrought, eastern Pa.	11.00	11.00	11.00	15.40
No. 1 wrought, Chicago	8.50	8.80	9.25	12.70
Rails for rolling, Chicago	11.50	11.85	12.10	14.85

Sheets

Business Shrinks Moderately—Some Mills Defer New Classification Until Third Quarter

SHEET PRICES, PAGE 91

Pittsburgh — Sheet orders are tapering gradually, currently showing a moderate decrease since a month ago. Demand from some directions is little changed. Orders from the automotive industry are fairly steady except that the Ford Motor Co. is taking smaller lots. Production continues around 40 per cent where it has held for the past several weeks. Prices are quotably unchanged although not thoroughly tested. Black sheets are 2.25c to 2.35c; galvanized, 2.80c to 2.90c; blue annealed, 2.00c to 2.05c for No. 13 gage, and 1.85c to 1.90c for Nos. 9 and 10; and autobody sheets, 3.10c. Some details of the new sheet classification program remain to be worked out although producers are preparing to adopt it.

New York—Sheet sellers generally appear to favor the proposed classification plan and at least two mills this week indicated their intention to put it into effect on third quarter business. Meanwhile, blue annealed sheets are holding at 2.00c, Pittsburgh; and blue annealed plates, 1.85c. Black sheets appear slightly firmer at 2.25c, Pittsburgh, there being less disposition to shade where extra finishes are required. Galvanized sheets are 2.80c to 2.85c. Demand generally is slack.

Philadelphia—Indications are that some leading sheet mills will adopt the new classifications for third quarter contracts. Current prices are unchanged, with black sheets slightly stronger. Despite general dullness in the market one eastern mill went into 100 per cent operation this week, possibly indicating substantial export bookings.

Buffalo—District sheet mills continue to operate at about 50 per cent. The market is irregular.

Youngstown, O. — Full-finished sheets for automotive and furniture interests are being produced and shipped in slightly increased quantities, but demand for common grades appears to be tapering. There is some confusion in the common sheet trade due to differences in understanding the proposed new classifications. It is believed practically all valley mills are agreed upon acceptance of the plan, but because of existing second quarter contracts it may not be practical to put it into effect until third quarter. Practically all carload sales of common black sheets are being made at 2.25c, Pittsburgh, but lower quotations are rumored for larger quantities. Blue annealed are 1.80c to 1.90c for Nos. 9 and 10, and 2.00c to 2.05c for No. 13 gage. Galvanized are 2.80c to 2.90c; and autobody, 3.10c.

Cleveland—The sheet market displays flares of activity occasionally, but shows signs of easing, due mainly to reduced automotive demand. Some bright spots are noted in automobile production but new orders for sheets from several companies are falling off. Barrel manufacturers and other consuming groups fail to boost schedules appreciably. Black sheets hold at 2.25c, the usual rumor of 2.15c still undoubtedly finding concrete evidence in certain sales, but by no means general. Other prices are unchanged, with galvanized 2.80c to 2.90c, Pittsburgh.

Chicago—Sheet orders continue to shrink and prices are irregular. Demand for blue annealed and prices are holding better than for other grades. Mill quotations for No. 10 blue annealed are 1.95c to 2.00c. Lack of farm equipment business leaves a broad gap.

Cincinnati—Sheet mill orders continue to reflect diverse demand, with automotive specifications slow.

St. Louis—Market prospects for sheets in May are more favorable, but no important upturn is anticipated during the remainder of the second quarter. Recent specifications show moderate expansion.

Current Finished Steel Prices

Prices in cents per pound unless otherwise stated

Steel Sheets

SHEET MILL BLACK, NO. 24

Pittsburgh, base	2.25c
Philadelphia, delivered	2.54c
Gary, Indiana Harbor	2.35c to 2.45c
Chicago, delivered	2.40c to 2.50c
Birmingham, base	2.40c to 2.50c
St. Louis, del.	2.70½c

TIN MILL BLACK, NO. 28

Pittsburgh, base	2.55c to 2.65c
Gary, base	2.65c to 2.75c

GALVANIZED NO. 24

Pittsburgh, base	2.80c to 2.90c
Philadelphia, delivered	3.09c to 3.19c
Chicago, delivered	2.95c to 3.05c
Gary, Indiana Harbor	2.90c to 3.00c
Birmingham, base	2.95c to 3.05c
St. Louis, del.	3.25½c

BLUE ANNEALED SHEETS NO. 13

Pittsburgh, base	2.00c to 2.05c
Chicago, district mills	2.10c to 2.15c
Chicago, delivered	2.15c to 2.20c
St. Louis, delivered	2.40½c
Philadelphia, delivered	2.29c
Birmingham	2.20c

BLUE ANNEALED NO. 9-10

Pittsburgh, base	1.85c to 1.90c
Chicago, district mills	1.95c to 2.00c
Chicago, delivered	2.00c to 2.05c
Philadelphia, delivered	2.14c
St. Louis, delivered	2.25½c
Birmingham	2.05c to 2.10c

AUTOMOBILE NO. 20

Pittsburgh, base	3.10c

FURNITURE NO. 24

Pittsburgh, patent leveled	3.50c

New Classifications, Pitts. base:

Heavy cold rolled No. 10, 2.35c; cold rolled No. 20, 2.95c; heavy furniture No. 10, 2.75c; light furniture No. 20, 3.35c; furniture No. 24, including patent leveling, 3.50c. Differentials of 10 and 15 cents, respectively, apply at Gary, Ind., and Chicago, delivered.

Tin and Terne Plate

Prices per 100 pound box Pittsburgh

Tin plate, coke base	$5.00

Gary, Ind., base 10 cents higher.

Long ternes, 24, unassorted, lb.	3.15c

Wire Products

(To Jobbers-Merchant Trade)

F.o.b. Pittsburgh, Cleveland base
(Per 100 pound keg)

Standard wire nails	$1.90 and 2.00
Cement coated nails	1.90 and 2.00
Galvanized nails	3.90 and 4.00

(Per pound)

Polished staples	2.35c and 2.45c
Galvanized staples	2.60c and 2.70c
Barbed wire, gal.	2.55c and 2.65c
Annealed fence wire	2.35c and 2.45c
Galvanized wire	2.80c and 2.90c

Woven wire fencing, retailers, Pittsburgh-Cleveland, net ton $65.

(To Manufacturing Trade)

Plain wire, 6-9 gage	2.20c to 2.30c
Spring wire	3.20c to 3.30c

Joliet, DeKalb, Waukegan, Ill., Anderson, Ind., Chicago, $1 over Pitts.-Cleve.; Duluth and Worcester, Mass., $2 higher; Fairfield, Ala., $3 higher.

Rivets

Struc. c.l., Pitts.-Cleve.	2.75c
Struc., c.l, Chicago	2.85c
7/16-in., smaller, Pitts.	70,10 and 5 off
Chi., Cleve.	70 to 70, 10 and 5 off

Steel Plates

Base, Pittsburgh	1.65c
Philadelphia, del.	1.85½c to 1.90½c
New York, delivered	1.93c to 1.98c
Boston, delivered	2.05c to 2.10c
Chicago, base	1.70c to 1.80c
Cleveland, delivered	1.83½c
Lackawanna, N. Y., base	1.75c to 1.80c
Birmingham, base	1.80c to 1.85c
Coatesville, Pa., base	1.75c to 1.80c
Pacific Coast, c.i.f.	2.00c to 2.05c
St Louis, del	1.95½c

Structural Shapes

Base, Pittsburgh	1.65c
Philadelphia, del.	1.76c to 1.81c
New York, del.	1.85½c to 1.90½c
Boston, del.	2.03½c to 2.08½c
Chicago, base	1.70c to 1.80c
Cleveland, delivered	1.83½c
Lackawanna, N. Y., base	1.75c to 1.80c
Birmingham base	1.80c to 1.85c
Pacific Coast, c.i.f.	2.05c to 2.15c

Bars

SOFT STEEL

Base, Pittsburgh	1.65c
Chicago, base	1.70c to 1.80c
Birmingham base	1.80c to 1.85c
Lackawanna, N. Y., base	1.70c to 1.75c
Pacific Coast, c.i.f.	2.15c
Cleveland, base, local del.	1.70c
Cleveland base, out. del.	1.65c
Philadelphia, del.	1.94c to 1.99c
New York, del.	1.98c to 2.03½c
Boston, del.	2.05c to 2.10c
Pittsburgh, cold finish	1.80c to 1.85c
Pittsburgh, forg. qual.	1.90c to 1.95c

RAIL STEEL

Chicago Heights	1.60c to 1.65c
Eastern mills	1.50c to 1.55c

IRON

Chicago, base	1.70c to 1.80c
New York, delivered	1.93c to 2.03c
Philadelphia, delivered	1.89c
Pittsburgh, refined	2.75c to 4.25c

REINFORCING

Pitts., billet cut lengths	1.90c
Stock lengths, mill	1.65c
Chi., billet	1.90c to 2.00c
Chi., rail steel	1.60c to 1.70c
Chi., rail steel, less carload	1.90c
Philadelphia, cut lengths	2.19c
Cleveland, cut lengths	1.95c to 2.05c

Cold Finished Steel Bars and Shafting

Base, Pittsburgh, Chicago, Buffalo and Cleveland	2.10c
Shafting, turned and ground, mill	2.45c to 2.90c

Corrosion, Heat Resist. Alloys

Base, Pittsburgh

18 per cent chrome, 8 per cent nickel
Sheets, 35c; plates, 31c; bars, 28c.

	A	B	C	D
Bars	19c	20.5c	23c	28c
Plates	21c	22.5c	25c	30c
Sheets	26c	27.5c	30c	35c
Hot strip	19c	20.5c	23c	28c
Cold strip	28c	29.5c	32c	37c

Carbon 0.12 and under; no nickel. A has chrome 15% and under, B over 15/18% inc., C over 18/23% inc., D over 23/30%.

Wrought Washers

Carloads, Pitts. dist.	$6.50 to $6.75 off
Carloads, Chicago dist.	6.70 to 6.80 off

Alloy Steel

Hot Rolled—F.o.b. Mills

Alloy Quality Bar Base is 2.65c

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.25	1.25-1.75 Ni.	1.05
2100	0.55	5100 .80 - 1.10	
2300	1.50	Cr.	0.45
2500	2.25	51.00 Cr.	
3100	0.55	spring	0.20
3200	1.35	6100 bars	1.20
3300	3.80	6100 Spring	0.95
3400	3.20	Cr., Ni., Van.	1.50
4100 .15 to .25		Carbon Van.	0.95
Mo.	0.50	9250 (flats)	0.25
4600 .20 to .30 Mo.		9250 (rds.,sq.)	0.50

Strip, Hoops Bands

Hot strip, to 6-in., Pitts.	1.60c
Hot strip 6 1/16 to 24-in. Pitts.	1.50c
Hot strip, bands 6 in. and under, Chicago	1.70c to 1.75c
Do. 6 1/16 to 24 in.	1.60c to 1.65c
Cooperage hoop, Pitts.	1.70c to 1.80c
Do, Chicago	2.00c to 2.10c
Cold rolled strip, Pitts., Cleve., 3 tons, over	2.15c to 2.25c
Worcester, 3 tons, over	2.40c

Rails, Track Material

Standard bess. and open hearth rails, mill	$43.00
Relay rails, Pitts., 60 to 90 lb.	$24.00 to 28.00
Light rails, 25-45, mills	$34.00
Light rails, Chicago	$36.00
Angle bars, Chi. base	2.75c
Spikes, railroad, mills	2.70c
Spikes, railroad, 7/16-in. and smaller, Pitts.	2.70c
Spikes boat, barge, Pitts.	3.00c
Spikes, railroad, Chi.	2.80c
Track bolts, Pitts., steam roads	3.80c
Do. standard, jobbers	73 off list
Track bolts, Chicago	3.80c
Tie plate, mills	$39.00

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham and Chicago

Discounts to legitimate jobbing or large consuming trade for full-case lots apply to May 10, 1930, lists.

CARRIAGE BOLTS

All sizes, cut thread ..... 73 off
Rolled thread ⅜ x 6 and smaller take 10 per cent lower list.
Eagle list ..... 73 off

MACHINE BOLTS

All sizes, cut thread, lag screws, plow bolts, Nos. 1-2-3-7 heads, tap bolts, blank bolts, stud bolts without nuts ..... 73 off
Tire bolts, 60, 10 and 10 off.
Stove bolts, 80, 10, 10, 5 off in pkgs.; 80, 10, 5, 2½ off in bulk.
Rolled thread machine bolts, ⅜ x 6 and smaller take 10 per cent lower list.

NUTS

Semifinished ..... 73 off

HEXAGON CAP SCREWS

Milled ..... 80-10-10-5 off
Upset 1 in. diam. and smaller ..... 85-10 off

SQUARE HEAD SET SCREWS

Milled ..... 80-5 off
Upset 1 in. and smaller ..... 80-10-5 off
Upset, larger than 1 in. ..... 80-5 off

Cut Nails, Chain, Piling

Cut nails, c.l., Pittsburgh	2.40c to 2.50c
do, less carloads, 5 kegs or over, 2.65c to 2.75c; and less than 5 kegs	2.80c to 2.90c
Chain, BB, BBB, 9/16-1½ in.	33 1/3 off
Sheet piling, Pitts.	1.90c

Bars

Highway Work Helps Bar Demand in West—Current Tonnage Goes at 1.65c, Pittsburgh

BAR PRICES, PAGE 91

Chicago—Improvement in bars, due chiefly to automotive specifications, road equipment and bars for road work, stimulated the level of finished steel shipping orders to one of the best weekly totals this year. Bar mill production is slightly above 55 per cent. Indifference to price makes the attitude of many buyers, from whom price pressure is negligible. The price range is 1.70c to 1.80c, Chicago, for soft steel bars. May schedules of cold-finished, cold-drawn and alloy steel bars, as well as parts makers and automotive plants, indicate a possible gain in May automotive shipments, as compared with April. Road building and excavating equipment is holding up.

New York—Steel bars are moving at 1.65c, Pittsburgh, in carlots, with smaller tonnages at 1.70c. Trading is slightly less active. Common iron bars are quiet at 1.60c to 1.70c, Pittsburgh, with the inside price the more representative.

Philadelphia—Steel bars are moving slowly at 1.65c to 1.70c, Pittsburgh, the former applying to carloads. Iron bars are 1.60c, Pittsburgh, base.

Pittsburgh—Continued quiet in new business in steel bars is deferring a general test of the market. The 1.70c price still is nominal while producers generally are obtaining 1.65c on what new business is appearing. Recent specifications lack improvement and April business showed a moderate decrease from that of March. Orders are limited in size as well as in number.

Cleveland—Demand for merchant steel bars continues at approximately last week's rate. May opens at the April rate as far as specifications are concerned. The local mill holds to 1.70c, Cleveland base, for delivery locally, but in neighboring districts and into Michigan 1.65c, Cleveland, is the common figure.

Cold-Finished Bar Inquiry Lightens

Cold Finished Prices, Page 91

Pittsburgh — Specifications for cold-finished steel bars are moderating slightly. Business during the past week was heavier inasmuch as tonnage usually is entered at that time for the new month but April business showed a decrease from March. The market continues 2.10c, Pittsburgh.

Cleveland—Cold-finished bar inquiry is small and price is becomming increasingly stressed in the market. Shipments are in fairly good volume. No upward trend is discernable in commitments of the automotive and allied industries. The 2.10c base Cleveland figure is quotably unchanged.

Barge Canal Moves Ore

New York—A substantial movement of chrome ore on the New York state barge canal is noted, the total to April 25 being 14,659 tons as compared with 4500 tons in the corresponding period in 1930. The canal opened its season early in April. No iron or steel moved on the canal during the week ending April 25.

Plates

Demand from Pipe Line Fabricators Is Slower—Tank Work Prospects Appear Better

PLATE PRICES, PAGE 91

Chicago—Plate prospects for oil tank work are more cheerful because of potential inquiry existing in the East Texas oil field development. Plate prices are unchanged at a base of 1.70c, Chicago. Shipments for pipe line fabrication in this territory are tapering, due to delayed scheduling of several recent pipe line projects.

New York—Plate buying is light, with the market unchanged at 1.75c to 1.80c, Coatesville, Pa., the lower price applying to carloads. Bids have been opened on 2500 tons of 48-inch steel pipe for a Hackensack, N. J., water company. This tonnage was mentioned last week as pending for an unstated project. Ship work is featured by the placing of 1000 tons of plates for three welded barges to be built by United Dry Docks Inc., for the Atlantic, Gulf & West Indies Steamship line. Tank work consists of a small order for the Standard Oil Co. at Hackensack, and approximately 100 tons for the Kendall Refining Co., Bradford, Pa., the fabrication to be done by Alco Products Inc.

Pittsburgh—Small orders are providing little test of the market and quotations remain somewhat nominal. Business is little changed but is lacking in awards of fabricated products. A fair volume of barge inquiry is pending but no new awards are noted. The market usually is 1.65c, Pittsburgh, on new business.

Cleveland—Incoming orders about hold their own. Base price at 1.65c to 1.70c, Pittsburgh, represents the figure at which commitments are moving. Support is given the market by oil and road machinery interests' specifications. Boiler shops are inactive, and work for the railroads and steamer repairs is far from satisfactory.

Philadelphia — Plate mill operations are off slightly, although one leading producer is hovering close to 50 per cent. The submarine V-9, requiring 600 tons of plates, is up for bids May 19.

Contracts Placed

1000 tons, three welded barges for Atlantic, Gulf & West Indies Steamship lines; construction contract to United Dry Docks Inc., New York., plates to unnamed mill.

150 tons, or more, for water tank, Kew Garden, Long Island, N. Y., to Chicago Bridge & Iron Works, Chicago.

Contracts Pending

2500 tons, 48-inch steel pipe, Hackensack, N. J.; bids opened.

100 tons, refinery distilling unit for Kendall Refining Co., Bradford, Pa., fabrication contract to Alco Products Inc., subsidiary of American Locomotive Co., Dunkirk, N. Y.

Navy Asks Supply Bids

Washington—Bids will be taken by the bureau of supplies and accounts, navy department on the following materials and dates:

May 12 for Norfolk, 5155 steel boiler tubes; May 12 for Philadelphia, 500 metal cutting band saws; May 12 for Hampton Roads or San Francisco, one hydraulic testing machine; May 12, for Brooklyn, Philadelphia and Mare Island, seamless steel tubing and seamless copper tubing for Norfolk; May 12 for Brooklyn and Hampton Roads, resistance wire.

Railroads

Car Buying High for Year in April—Missouri Pacific Buys 15,000 Tons Rails

TRACK MATERIAL PRICES, PAGE 91

New York—Domestic freight car bookings in April totaled 2798 cars, against 2116 in March, 50 in February and 100 in January. Award of 2000 cars by the Northern Pacific to its own shops was the outstanding item with 500 for the Great Northern to a car company, second most important. Comparative statement follows:

	1931	1930	1929	1928
Jan.	100	5,072	13,196	4,160
Feb.	50	17,027	15,944	10,220
March	2,166	6,118	12,023	2,958
April	2,798	1,997	8,205	6,043
May		1,392	7,562	2,531
June		998	5,886	2,422
July		1,389	341	582
Aug.		1,111	2,854	677
Sept.		576	4,517	1,378
Oct.		4,116	19,506	2,853
Nov.		2,621	6,361	6,140
Dec.		2,729	9,710	4,799
Total	5,114	45,146	106,105	44,763

Current demand is light. Board of transportation takes bids May 12 on special rails, frogs and switches, contract to be placed in two groups. Rails required are special material which will be used for replacement. Tonnage involved is uncertain.

Pittsburgh — Specifications from railroads for steel products continue light and little changed from the rate of recent weeks. The market is quiet in new business, inquiry for practically all material lacking. Rail mill operations shown no improvement.

Cleveland—Carriers are slow releasing rails and fastenings, orders for which are on mills' books. In many cases profits, it is pointed out, would be seriously impaired with replacement or improvement to rights of way under present conditions.

Chicago—Missouri Pacific railroad has placed the first rail order in many weeks, awarding 15,000 tons as initial buying for this year to four rail mills. Rail releases are fairly heavy. Rail mill operations in this district have dropped from 50 to 45 per cent, where it is expected output will remain for 30 days or more. Chicago, Milwaukee, St. Paul & Pacific has been expected to order 23,000 tons of rails but formal inquiry is not announced. Track fastenings orders continue, as for the last 60 days, on the basis of 1500 to 2000 tons weekly.

Birmingham, Ala.—Railroads are not speeding up specifications against contracts placed since first of year and Ensley works of Tennessee Coal, Iron & Railroad Co. is maintaining a steady pace in rail manufacture as well as in track fastening production.

Philadelphia — Pennsylvania railroad is inquiring for 400 kegs of spikes.

Car Orders Placed

Canadian National, five coaches, to Canadian Car & Foundry Co., Montreal, Que.

Cudahy Packing Co., steel parts for 25 underframes, to Pullman Car & Mfg. Corp., Chicago.

Erie railroad, one 30-cubic yard automatic dump car, to Koppel Industrial Car & Equipment Co., Pittsburgh.

Northern Pacific, 1500 box and 500 stock cars, to own shops.

United Verde Copper Co., four air dump cars, to Western Wheeled Scraper Co., Aurora, Ill.

Union Pacific, six air dump cars, to Differential Steel Car Co., Baltimore.

Union Tank Car Co., 15 insulated tank cars of 11,000 gallons capacity, to American Car & Foundry Co., New York.

Rail Orders Placed

Missouri Pacific, 15,000 tons, divided among Illinois Steel Co. and Inland Steel Co., Chicago; Tenessee Coal, Iron & Railroad Co., Birmingham, Ala.; and Colorado Fuel & Iron Co., Denver.

Locomotives Pending

Delaware & Hudson, one locomotive, contemplated.

Tientsin-Pukow, China, eight locomotives of 4-6-2 type, bids asked through T. S. Sun, managing director.

National Railways of Mexico, 32 locomotives to be rebuilt in own shops; these are in addition to 60 on which similar work was recently completed.

Here and There in Industry

(*Concluded from Page* 33)

Research Corp. was organized in the summer of 1930 and has the following officers: Comfort A. Adams, professor of engineering, Harvard university, Cambridge, Mass., president; J. H. Deppeler, chief engineer, Metal & Thermit Corp., New York, vice president; C. A. McCune, treasurer; and James W. Owens, secretary.

□ □ □

Central Can Co. Inc., Chicago, has moved to larger quarters at 4527 West Lake street.

□ □ □

John E. Greenawalt, metallurgist and engineer, specializing in the manufacture of sintering plants, moved April 15 from 110 East Forty-second street to the forty-first floor of the Chrysler building, New York.

□ □ □

Braeburn Alloy Steel Corp., Braeburn, Pa., has moved its offices and warehouse at Cleveland to larger quarters at 1371 East Eighteenth street. J. H. Cox is district sales manager.

□ □ □

Jessop Steel Co., Washington, Pa., has leased a 1-story building at 1742 Carrol avenue, Chicago, for a five-year period and will move from its former Chicago district office at 230 North Jefferson street.

□ □ □

Cocker Machine Foundry Co., Gastonia, N. C., has been reorganized by George B. Cocker, general manager, who has bought the interests of the former officers, T. L. Craig, president, D. J. Craig, vice president, and J. Robert Craig, secretary and treasurer. Mr. Cocker becomes president, J. D. Reeves secretary and J. Robert Craig secretary and treasurer. The company was organized in 1913 to manufacture textile machinery, specializing in warp equipment.

Tin Plate Specifications Lighter; Output Slower

Tin Plate Prices, Page 91

Pittsburgh — Tin plate specifications are fairly active but lighter than during recent weeks when orders were entered for June shipment. Output is at about 75 per cent, regarded as fair considering general conditions, although the downward trend in production has occurred slightly earlier than usual. Tin plate continues $5, Pittsburgh, per base box.

Youngstown, O.,—Continued capacity rates for the sixteenth consecutive week characterize district tin plate mill operations for independents and the leading producer. Specifications in hand insure operations on the same general scale through this month and into June. A similarly satisfactory operating rate is reported from tin mills in adjacent districts. Tin plate is $5, per base box, Pittsburgh.

Structural Shapes

Private Construction Fails to Bolster Inquiry, Slowly on Decline—Specifications Gain Slightly, However, in West —Awards Total 22,690 Tons, Year to Date, 780,489 Tons

STRUCTURAL SHAPE PRICES, PAGE 91

New York—Lack of private construction and gradual closing on public works portends continued slowing up in structural steel, long a leader in the industry during the current dullness. While heavy tonnage still remains to be placed, new work and inquiry is slowly on the decline. Outside of public and railroad demand buying of fabricated structural steel has been practically at a standstill for weeks. Two large jobs loom in the near future. One, a large office building on the site of the Belmont hotel, Pershing Square, will take close to 10,000 tons. The Belmont is now being wrecked, but no formal inquiry for steel has been heard. The port authority's inland freight terminal will take close to 30,000 tons, but not all structurals. Bids went in this week on two viaducts in Northern New Jersey, 1200 tons. Awards, while more numerous, are for smaller tonnages. Prices of plain material range 1.70c to 1.75c eastern mill. Fabricated prices are erratic and weak.

Boston—Nearly 600 tons of shapes were awarded in the past week, while 1000 tons more are pending. Deerfield-Greenfield state bridge will take 800 tons and there is 200 tons in a new plant for the New England Fuel & Transportation Co., Everett, Mass.

Philadelphia — Purchase of 3000 tons of structurals for the Reading, Pa., courthouse features the shape market. Stucturals are unchanged at 1.70c to 1.75c, nearest mill.

Pittsburgh—Structural awards are slow and lack the improvement commonly noted at this period. Awards and inquiry usually call for only small lots. Specifications for plain material are fairly steady but new business is light and prices are receiving little test. The market usually is 1.65c, Pittsburgh, with the 1.70c figure still nominal.

Cleveland—Inquiry continues fairly steady with work for figuring continuing to come up. Plain material is more 1.65c, Pittsburgh, for the bulk of sales. Crowell & Little will award 625 tons of shapes for the City hospital tuberculosis addition within the week. Cleveland Union Terminal Corp. will build only one of the proposed two bridges, general contract for which went to Industrial Construction Co. Of the several bridges for Ohio, the Ashtabula, O., one will not be built and the 400 tons in the garage for Toledo, O., has been withdrawn. Republic Structural Iron Works took 100 tons in the Huron road hospital.

Chicago—From 4000 to 5000 tons alone is out in small bridge inquiry. Structural steel specifications are slightly improved. Plain material is quoted 1.70c to 1.80c, Chicago. About 8000 to 10,000 tons is taking shape for inquiry, including 1500 tons for the addition to the Cook county nurses' home, and 4100 tons for the Santa Fe railroad overhead crossing of the Illinois-Michigan canal. About 1500 tons also is on inquiry from the coast. The Chicago and Oak Park, Ill., school programs are of importance. Additions planned for two Oak Park schools will cost $255,000.

Birmingham, Ala.—A few small tonnage contracts are reported this week. Shop operating schedules are from four to five days weekly.

Contracts Placed

6000 tons, outer drive bridge, Chicago, to American Bridge Co., Pittsburgh; reported as going to unstated fabricator in STEEL for April 30.

3000 tons, courthouse, Reading, Pa., to unstated fabricator, through McCloskey Contracting Co., Philadelphia.

2000 tons, Boston bridge, Allegheny county, Pa., to Fort Pitt Bridge Works Co., Pittsburgh.

1693 tons, warehouse for New York Central railroad, 400 West Fourteenth street, New York, to Post & McCord Inc., New York.

Awards Compared

	Tons
Awards this week	22,690
Awards last week*	25,502
Awards two weeks ago	21,100
Awards this week in 1930	61,464
Av. weekly awards, 1930	35,242
Av. weekly awards, 1931	41,078
Av. weekly awards, April	49,224
Total awards to date, 1930	633,019
Total awards to date, 1931	780,489

*Revised

1000 tons, building, Pilgrim hospital, Long Island, N. Y., to B. Schacht & Son, sublet to McClintic-Marshall Corp., Bethlehem, Pa.

1000 tons, postoffice, Camden, N. J., to unstated fabricator; Agostini Bros., New York, general contractors.

950 tons, Battle Hill school, White Plains, N. Y., to Allied Bronze & Architectural Iron Works, Bronx, N. Y., through D. M. & W. Construction Co.

900 tons, gymnasium, Dickinson high school, Jersey City, N. J., to F. G. Schaefer Iron Works, Edgewater, N. J.; Auf der Heide Contracting Co., West New York, N. J., general contractor.

800 tons, state prison, Attica, N. Y., to unstated fabricator; J. Weinstein Building Corp., New York, general contractors.

772 tons, gymnasium, Hunter college, New York, to Hinkle Iron Co., New York.

650 tons, theater, Third avenue and Seventy-second street, New York, to unstated fabricator.

550 tons, overhead bridge, Grand Island, Nebr., to Paxton & Vierling Iron Works, Omaha, Nebr.

540 tons, three bridges, Louisville & Nashville railroad, to Virginia Bridge & Iron Co., Birmingham, Ala.

514 tons, garage, Sixty-third street and York avenue, New York, to Hedden Iron Construction Co., New York, division of McClintic-Marshall Corp., Bethlehem, Pa.

500 tons, tank lining building, American Hard Rubber Co., Butler, Pa., to H. R. Goeller Inc., Hillside, N. J.; Walter Kidde & Co., general contractor.

480 tons, laboratory, bureau of standards, Washington, to Bethlehem Construction Co., Bethlehem, Pa.

450 tons, temporary bridge over south branch of Chicago river, at Halsted street, Chicago, to McClintic-Marshall Corp., Bethlehem, Pa.

425 tons, wharf work, board of commissioners, Port of New Orleans, to Jones & Laughlin Steel Corp., Pittsburgh.

425 tons, exchange building for Indiana Bell Telephone Co., Indianapolis, to Hetherington & Berner, Indianapolis.

410 tons, bridge, Dayton, O., Pennsylvania railroad, to McClintic-Marshall Corp., Bethlehem, Pa., previously reported going to unstated fabricator.

350 tons, building, Electro Metallurgical Co., Charleston, W. Va., to Pittsburgh Bridge & Iron Works, Pittsburgh.

350 tons, Greentree inn, Westchester Pa., to Robinson Iron & Steel Co., Philadelphia; previously noted as going to an unstated fabricator.

350 tons, bridge over San Roquil creek, Santa Barbara, Calif., to Minneapolis-Moline Power Implement Co., Minneapolis.

350 tons, grade crossing, Staten Island Rapid Transit Corp., Staten Island, N. Y., to Jones & Laughlin Steel Corp., Pittsburgh.

343 tons, bridge, highway, Pembroke to Allentown, N. H., to American Bridge Co., Pittsburgh.

325 tons, Prospect school, Pittsburgh, to Keystone Engineering Co., Pittsburgh.

300 tons, building, Philadelphia & Reading railroad, to American Bridge Co., Pittsburgh.

300 tons, Cape creek bridge, Lane county, Oregon, to unstated interests

through John K. Holt, Salem, Oreg., general contractor.

305 tons, 80,000-barrel tank, Texas City, Tex., to Pittsburgh-Des Moines Steel Co., Pittsburgh.

285 tons, hangars, Allegheny county airport, Pittsburgh, to McClintic-Marshall Corp., Bethlehem, Pa.

280 tons, post and pipe supports, subway 107, section 8, New York, to American Bridge Co., Pittsburgh.

272 tons, Hingham-Hull state bridge, Hingham, Mass., to New England Structural Co., Boston.

248 tons, bridge over Weir river, Mass., to Eastern Bridge & Structural Co., Worcester, Mass.

223 tons, T. & P. Saggues building, Fort Worth, Tex., to North Texas Iron & Steel Co., Fort Worth.

190 tons, assembly shop, Newport, R. I., to Bethlehem Fabricators Inc., Bethlehem, Pa.

180 tons, street railway bus garage, Chelsea, Mass., to Eastern Bridge & Structural Co., Worcester, Mass.

170 tons, ward building, state hospital, Beacon, N. Y., to Ferry & Macy Iron Works, Beacon, N. Y.; A. E. Stephens Co., Springfield, Mass., general contractor.

161 tons, industrial arts building, normal school, Oswego, N. Y., to Utica Structural Steel Co., Utica, N. Y.; Bedford Construction Co., Utica, general contractor. Kalman Steel Co., Chicago, awarded 51 tons concrete bars.

160 tons, highway bridge, New York state, to American Bridge Co., Pittsburgh.

149 tons, route 2, section 6, Hasbrouck, N. J., to American Bridge Co., Pittsburgh.

129 tons, apartment, DeVoe avenue, near 177th street, Bronx, N. Y., to Eschen & Oboler Iron Works, Bronx.

125 tons, grade crossing, Cambridge, N. Y., for Lackawanna railroad, to McClintic-Marshall Corp., Bethlehem, Pa., through Wilson & English Construction Co.

120 tons, ornamental work for Ford Motor Co. plant, Seattle, to Wallace Bridge & Structural Steel Co., Seattle.

120 tons, Oakmont public school, Philadelphia, to Norris Iron & Wire Works, Norristown, Pa.

112 tons, extension to naval hospital, Chelsea, Mass., to A. L. Smith Iron Works Corp., Chelsea.

110 tons, grade crossing, Junius, N. Y., New York Central railroad, to American Car & Foundry Co., New York.

105 tons, hangar and machine shop, Boeing field, Seattle, to Austin Co., Cleveland.

100 tons, or more, dormitory, state school for blind, Batavia, N. Y., to August Feine & Sons Co., Buffalo; L. C. Whitford, Wellsville, N. Y., general contractor. Subcontract for reinforcing to Kalman Steel Co., Buffalo.

100 tons, crane runway, National Transit Pump & Machinery Co., Oil City, Pa. to Pittsburgh Bridge & Iron Works, Pittsburgh.

100 tons, high school Renton, Wash., to Pacific Car & Foundry Co., Seattle.

100 tons, Huron road hospital, East Cleveland, O., to Republic Structural Iron Works, Cleveland, through John Gill & Sons, general contractor.

100 tons, state highway bridges, Logan county, Illinois, to McClintic-Marshall Corp., Bethlehem, Pa.

100 tons, miscellaneous bridgework, Illinois, to Vierling Steel Works, Chicago.

Contracts Pending

4100 tons, Santa Fe railroad overhead crossing at Illinois-Michigan canal, Chicago.

1735 tons, five bridges at following points for Pennsylvania railroad, award of which expected shortly: 985 tons, Woods Run, Pa., McClintic-Marshall Corp., Bethlehem, Pa., reported low; 110 tons, Pine Valley, N. Y., American Bridge Co., Pittsburgh, reported low; 320 tons, Steubenville, O.; 185 tons, Crafton, Pa.; and 140 tons, Centerburg, O.

1200 tons, Sixth street bridge, Los Angeles; bids received.

900 tons, highway bridges in Illinois.

800 tons, highway bridge, Deerfield, Mass.

800 tons, Wabash railroad bridge, Oakwood, Mich.

750 tons, building for Cord Auto Sales & Service Co., Los Angeles, Calif.

700 tons, addition, public school 118, Queens, N. Y.

650 tons, Cress building, Sacramento, Calif.

650 tons, bridge for Columbus & Greenville railroad, Greenville, Miss.

600 tons, highway bridge over Red river, Odell, Tex.

575 tons, state trunk highway construction, Wisconsin; bids May 14.

508 tons state emergency relief construction, Wisconsin; bids May 6.

500 tons, state warehouse, Albany, N. Y.

400 tons, grillages, New York Central railroad, Thirtieth street yard, New York.

400 tons, exchange building for Illinois Bell Telephone Co., Joliet, Ill.

350 tons, highway bridge, Omaha, Tex.

303 tons, bridge over Ell river, Humboldt county, Calif., bids received.

300 tons, highway bridges in Wisconsin.

300 tons, highway bridge, Plymouth Falls, Oreg.

300 tons, highway bridge, Klamath, Oreg.

300 tons, Islais creek bridge, San Francisco; bids received.

282 tons, state trunk highway construction, Wisconsin; bids May 6.

200 tons, building, port authority, New York.

200 tons, New England Fuel & Transportation Co. plant, Everett, Mass.

198 tons, bridge over Clear creek, Shasta county, Calif.; bids received.

175 tons, warehouse, port commission, Oakland, Calif.; bids received.

150 tons, highway bridges, Pennsylvania.

100 tons, Tulsa State Fair association, Tulsa, Okla.; bids later, plans revised.

Unstated tonnage, municipal bridge, Gowen avenue, Philadelphia.

Concrete Bars

Road Work Delayed in Illinois—Prices Show Unsteadiness in Bars—Several Large Awards Expected in East—Week's Contracts Largest Since Second Week of April

REINFORCING BAR PRICES, PAGE 91

New York—Several large concrete reinforcing bar projects are due to be closed within the next week. Prices on small lots are steadier, but large tonnages continue to be closed at concessions. L. Balkin Co., Chicago, was low on the general contract for the Canandaigua veterans' hospital buildings. A. W. Banko was low on the Bronx Parkway extension contract which will take about 235 tons. Road mesh volume is slightly ahead of usual seasonal demands. Mesh prices, while none too steady, are relatively firmer than bars. Readvertised bids on the Queens anchorage, Triboro bridge, went in May 5, 1000 tons.

Boston—Some figuring is going on for round tonnages, but lack of funds seems to be holding back awards Some 200 tons for small jobs figured in the past week, while 240 tons were awarded to Joseph T. Ryerson & Son Inc. for a schoolhouse at Lynn, Mass. A state bridge at Deerfield, Mass., is pending.

Pittsburgh—Reinforcing bar business reflects the usual spring stimulus, April orders being moderately ahead of those of preceding months. Quietness continues in awards in this district although small lot inquiry is slightly more active. Prices are slightly unsteady, the market generally being quoted 1.65c for stock lengths and 1.90c for cut lengths, with larger lots occasionally commanding less.

Cleveland—Inquiry for concrete bars continues to be dull in this district. Award is lacking of any size and several building projects taking sizable tonnages still are pending.

(*Concluded on Page 99*)

Awards Compared

	Tons
Awards this week	8,296
Awards last week*	3,359
Awards two weeks ago	5,600
Awards this week in 1930	13,165
Av. weekly awards, 1930	6,990
Av. weekly awards, 1931	7,061
Av. weekly awards, April	5,627
Total awards to date, 1930	132,873
Total awards to date, 1931	134,157

*Revised

Strip

April Orders Lighter Than March—Chicago Meets Heavier Needs for Hot-Rolled

STRIP PRICES, PAGE 91

Pittsburgh—Strip business, although still quiet, shows little additional moderation. April orders and shipments were lighter than in March, due largely to the decline in requirements of some automotive interests. The outlook for May is uncertain but little improvement is in prospect. Prices generally are steady at 1.50c to 1.55c for wide hot strip and $1 a ton higher for narrow material. Cold-rolled strip is 2.15c to 2.25c. Mill operations continue around 40 per cent for hot strip and 20 per cent for cold strip.

Worcester, Mass.—Cold-rolled strip output is easing after three months of satisfactory production. Demand from the west coast continues strong, probably because of low stocks. Prices have softened to 2.40c.

New York—Strip buying appears less active than a week ago. Hot strip is 1.55c, Pittsburgh, for wide, and 1.65c, for narrow. Cold-rolled is 2.25c.

Philadelphia—The market is quiet. Prices are steady.

Cleveland — Hot-rolled strip is under pressure and at 1.50c to 1.55c, Pittsburgh, for wide and 1.60c to 1.65c for narrow, presents a mixed picture in that persistent reports are heard of the inside figure, yet many leading producers have failed to meet anything below 1.55c and 1.65c in this district. The leading interest in the cold-rolled market is quoting nothing less than 2.25c, Cleveland, on new business. Strip sales are irregular and are not developing a trend in either direction. Automotive support is good from several quarters, though evidence accumulates of lessening in the needs of a leading Detroit district manufacturer.

Chicago—Hot-rolled strip mills have a heavier flow of specifications during the week, chiefly from automotive builders and parts makers. Some possibility is seen that May automotive schedules will gain slightly over April. Wide sizes of hot-rolled are quoted, 1.60c, Chicago. Little second quarter contracting is reported in cold-rolled material. Hot-strip mills are engaged at 40 to 50 per cent.

Hot strip producers say that 1.60c, Chicago, thus far has been the minimum to large users, despite buyers' pressure for lower prices.

Wm. Glatting Aluminum & Brass Foundry has been organized and placed in operation at Hamilton, O., by William Glatting.

Operations Show Further Slight Recessions

Youngstown, O.—Steel ingot operations in the Mahoning valley are one point lower this week at 42 per cent. Nineteen furnaces are melting of 51 available for independents. Moderate improvement in demands for small pipe, continued weakness in large pipe buying, tapering in the automobile steel business and continued strength in the tinplate market are reported by leading manufacturers. Republic Steel operations in this district are estimated at 48, Sheet & Tube at 33, Carnegie Steel at 50, and Newton Steel at 65 per cent. Sharon Steel Hoop is at 53 per cent. Empire Steel sheet mills are idle.

Philadelphia—Eastern mills are making ingots at a 44 per cent capacity level this week, representing a drop of one and half points from last week. A leading mill in this district is at 48 per cent of capacity, or down two points.

Buffalo—District steelworks continued to operate at 59 per cent of capacity, maintaining a rate equal to the high point of the year.

Pittsburgh — Steelmaking operations are tending downward while finishing mill schedules generally are steady. Ingot output is down about two points to slightly above 45 per cent, blast furnace operations of steelworks being reduced by one, to 20 active stacks of 54 in the district. Sheet production is unchanged at 40, with tin plate down a trifle at 75. Strip is unchanged at 40, pipe continuing 35.

Cleveland—Ingot operations are unchanged this week in aggregate and separately for the four district mills. Nineteen open-hearth furnaces are pouring of a potential 34, or at the 59 per cent rate maintained for the past two weeks.

Chicago—Ingot output remains at 50 per cent, showing no change for about two weeks. Steelworks are using more generously from huge scrap piles and reducing hot metal. As a consequence, the leading interest has banked another blast furnace at Gary, leaving only four in blast here, and 9 of its 27 steelworks stacks. Fifteen of the 36 steelworks blast furnaces in the district are active. Several of the finishing mills have gained slightly, but rail mill capacity is down five points to about 45 per cent.

Birmingham, Ala.—No change is noted in ingot production and the estimate of 65 per cent of capacity holds. Sixteen open-hearth furnaces and 13 blast furnaces are active. This rate of 65 per cent has been unchanged since the second week in February.

Warehouse Sales Show Mixed Tendency

Warehouse Prices, Page 113

Detroit—Warehouse business in iron and steel, while still spotted, shows slight improvement. Considering all products, April registered a slight gain over March, and May opens moderately auspiciously. All prices are steady.

Philadelphia — Warehouse prices are unchanged, following the recent reduction in black and galvanized sheets. Black at 3.50c is off $2 a ton, and galvanized at 3.95c is off $4.00. Buying continues light.

New York—Slight improvement continues in warehouse buying of steel products, the increase being well spread among jobber stocks. Prices are more settled, although there continues to be some variance on several items. Cold finished prices are firm.

Baltimore—Although easy, jobbing prices are unchanged. Business continues exceedingly quiet. Last revision in list prices was a month or so ago, when black sheets were reduced to 3.50c and galvanized sheets to 4.00c. The former price is the same as that recently put into effect in the Philadelphia district, while the latter is 5.00c per 100 pounds above the 3.95c quotation, also recently announced in Philadelphia.

Cleveland—Improvement in demand for warehouse goods in this district is slow to materialize. Some jobbers report slight recessions. Outlook for May indicated volume will show slight if any gain over April.

Chicago—Warehouse sales in both March and April gained over the preceding months, largely by the performance of a single week in each month. This is similar to 1922. Jobbers feel that sales after the summer vacation period are ready to take on from a more settled level. Alloy and cold-drawn steel is fairly active.

Concrete Bars

(*Concluded from Page* 95)

Bars going into road building are not in demand.

Philadelphia—Reinforcing bar demand is slightly better. Early award is expected on 175 tons for the Reading, Pa., courthouse. Taylor-Davis Inc. took 300 tons for municipal sewage work, Philadelphia.

Chicago—Less than half the reinforcing bars for the scheduled 1000 miles of Illinois road surfacing this year has been let. The program is a part of the 9800-mile system started several years ago, which is about three-fourths completed. Rail steel bars for road work are 1.65c to 1.75c. A 500-ton school project has been awarded at Minneapolis, and several hundred tons of bars are pending for the dormitory and Hurley building on the campus of Notre Dame university, South Bend, Ind. Inquiries have tapered, but fabricators see prospects of improved building work late in the summer.

Contracts Placed

1600 tons, highway route 2, section 6, Hasbrouck Heights, N. J., to route 4, N. J., to Faitoute Iron & Steel Co., Newark, N. J., through George M. Brewster & Son Inc., Bogota, N. J., general contractor.

700 tons, store, New Orleans, for Sears, Roebuck & Co., Chicago, to Joseph T. Ryerson & Son Inc., Chicago.

600 tons, Market street subway, Philadelphia, to Truscon Steel Co., Youngstown, O.

500 tons, Illinois road work, to Truscon Steel Co., Youngstown, O.

500 tons, school, Minneapolis, to C. A. Turner Co., Minneapolis.

400 tons, addition to Attica, N. Y., prison, to unstated Buffalo district fabricator.

305 tons, bridge over San Dieguito river, San Diego county, Calif., to unstated company.

300 tons, state highway, Westchester county, N. Y., to Truscon Steel Co., Youngstown, O.

300 tons, municipal sewage plant, Philadelphia, to Taylor-Davis Inc., Philadelphia.

240 tons, schoolhouse, Lynn, Mass., to Joseph T. Ryerson & Son Inc., Chicago.

213 tons, bridges Brazos county, Texas, to Alamo Iron Works, San Antonio, Tex.; W. W. Vann & Co., Mercedes, Tex., general contractor.

211 tons, tunnel, Pennsylvania railroad, under Arlington Memorial bridge, Washington, to Concrete Steel Co., Pittsburgh; J. H. Coleman, Clarendon, Va., general contractor.

200 tons, filtration basin, Winnetka, Ill., to American System of Reinforcing, Chicago.

200 tons, Copley hospital, Aurora, Ill., to Calumet Steel Co., Chicago.

138 tons, highway work in Los Angeles county, Calif., to unstated company.

100 tons, building, district commissioners, Washington, to Dietrich Bros., Baltimore.

Contracts Pending

4000 tons, Sixth street bridge, Los Angeles; bids received.

1000 tons, Cincinnati union terminal; James Stewart & Co., New York, general contract; subcontract for foundations and piling let to MacArthur Concrete Pile Corp., Cleveland.

353 tons, state emergency relief construction, Wisconsin; bids May 6.

230 tons, highway, Bronx parkway extension to Croton lake, Westchester county park commission, N. Y.

220 tons, highway work, Sacramento county, Calif.; bids May 20.

200 tons, state bridge, Deerfield, Mass.

150 tons, highway, Central Park avenue, Westchester county; bids May 5.

125 tons, four bridges, Tulare county, Calif., bids May 20.

108 tons, bridge over Ell river, Humboldt county, Calif.; bids received.

100 tons, state trunk highway construction, Wisconsin; bids May 14.

100 tons, bridge, Waterside drive overpass, Washington; bids May 15.

100 tons, McLean avenue bridge, Yonkers, N. Y.; bids in.

100 tons, science building, Century of Progress exposition, Chicago.

Screw Stock Is Awarded

New York—Keystone Drawn Steel Co., Spring City, Pa., has been awarded 100,000 feet cold-rolled screw stock for the Frankford arsenal, Pa., on a bid of 3.74c.

Cramp Bid Is Low on Castings Inquiry

New York—Wm. Cramp & Sons Ship & Engine Building Co., Philadelphia, was low with a bid of $236,440.80 on board of water supply contract, 232, which calls for equipment involving approximately 450 tons of manganese bronze castings and 133,000 pounds of steel castings. This equipment is for drainage shaft 9A, city tunnel 2, and includes two 66-inch bronze section valves, two lines of 66-inch bronze waterway castings, two bronze doors, two 16-inch bronze gate valves, two 16-inch bronze needle valves, one 18-inch and one 6-inch bronze check valves, bronze piping, miscellaneous bronze and steel castings. American Locomotive Co. was second in the bidding.

Commercial Steel Treating Corp., Detroit, has increased capital from $50,000 to $100,000.

Pipe

Cast Prices Soft in East—8000 Tons of Cast Up in West—Line Pipe Continues Quiet

PIPE PRICES, PAGE 113

New York—Direct mill shipments of lap and butt weld pipe are now base plus two fives, compared with base plus one five formerly.

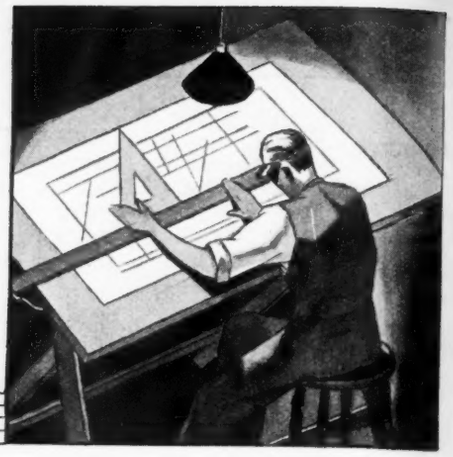
Cast iron pipe contracting and inquiry are dull. Prices are weak, as low as $32, eastern foundry being reported on some recent business. Resumption of subway work calls for several hundred tons of cast pipe, but this will not be placed for some time. Bergen Construction Co. is low on general contract for Westchester county, taking several hundred tons. Spring Lake, N. J., has bids on 1000 tons of 6 to 10-inch. Bids close May 14 on several hundred tons for the Pine Bush water district, Crawford, Orange county, N. Y. Figures are also in on water line pipe for the Clinton and Dannemora prisons.

Boston—Close to 600 tons were contracted for in this district in the week. United States Pipe & Foundry Co. took the 1931 requirements for Peabody, Mass., also 155 tons of 6 and 8-inch for Mansfield, Mass.

Pittsburgh—Continued quietness in the line pipe market has caused producers to revise considerably earlier estimates of the amount of business of this nature that would be placed this year. A number of lines remain pending but hesitancy is noted in closing. Proposed line of the North Central Gas Co. has been abandoned. Standard pipe shows but little improvement since a month ago while activity in tubes and mechanical tubing is lighter in April.

Chicago—About 8000 tons of municipal cast pressure pipe is before the market, a portion in small lots for contractor distribution. Chicago, which has just purchased 535 tons of 20-inch, has an inquiry for 5000 tons of 6 to 12-inch, and Detroit, 700 tons of 36-inch. Milwaukee is in the market for 1136 tons of 6 to 20-inch. Price made for the last Chicago order was $42, delivered. Private work is tapering from the previous level.

Birmingham, Ala—Business being placed is hardly keeping pace with production and some reduction in output is now planned. Steady shipment of various sizes is under way, mostly westward. Quotations are



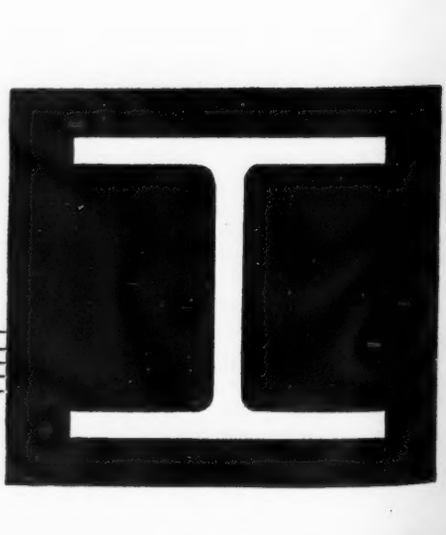
INCLUDE *this*

ECONOMY IN YOUR PLAN!

THE ECONOMY AND SUPERIORITY of riveted or welded structural steel is being recognized in a rapidly widening variety of uses and fields, particularly in the manufacture of machinery bases and frames. Many manufacturers, facing highly competitive sales conditions, are incorporating structural steel in their designs to reduce costs and to improve their product.

The use of structural steel eliminates the capital investment, overhead and operating expenses of a pattern shop, patterns in storage and foundry. Instead, there is only a small stock pile of selected rolled steel shapes, available for instant use and capable of being fabricated into an endless variety of machine parts. The time between design and delivery is materially shortened.

C B Sections have added a new impetus to this modern method of machine construction because of their unique advantages. Carnegie Engineers are at your service at all times and will gladly consult with you regarding the use of structural steel in machine construction.



CARNEGIE STEEL COMPANY · PITTSBURGH

Subsidiary of United States Steel Corporation

134

weak and concessions are heard on $35 to $36, six-inch and over sizes.

Cast Pipe Placed

10,000 feet 6 and 8 inch, Gorham, N. H., to R. D. Wood & Co., Philadelphia, Pa.

535 tons, 20-inch pipe for Chicago, to Glamorgan Pipe & Foundry Co., Birmingham, Ala.

155 tons, 6 and 8-inch, Mansfield, Mass., to United States Pipe & Foundry Co., Burlington, N. J.

139 tons, mixed sizes, Weston, Mass., to Warren Foundry & Pipe Co., Phillipsburg, N. J.

110 tons, mixed sizes, Littleton, Mass., to R. D. Wood & Co., Philadelphia.

100 tons, 6 and 8 inch, Winchendon, Mass., to Donaldson Iron Co., Emaus, Pa.

Unstated, 1931 requirements, Peabody, Mass., to United States Pipe & Foundry Co., Burlington, N. J.

Steel Pipe Placed

800 tons, 6⅝-inch, for Pennsylvania Power & Light Co., Harrisburg, Pa., to an unstated mill.

Cast Pipe Pending

5000 tons, 6 to 12-inch, for Chicago board of public works; bids May 12.

1000 tons, 6 to 10-inch, for Spring Lake, N. J.; bids in.

700 tons, 36-inch, for Detroit; bids May 8.

Semifinished Market Quiet; Prices Easier

Semifinished Prices, Page 102

Pittsburgh—Contracting for semifinished steel is lacking and new business is limited to small lots which provide little test of the market. Prices usually remain $30 for rerolling billets, slabs and sheet bars and $36 for forging billets, although reports of concessions continue. Wire rods are $35 to $37.

Chicago—Sheet bar shipments are expected to gain slightly this month. Semifinished steel contracting is quiet and several buyers have failed to obligate themselves to expected amounts. Small billets and blooms are quoted $31, Chicago; forging billets $36.

Youngstown, O.—Infrequent sales of sheet bars are made to nonintegrated mills here. Even less frequent are sales of billets, as consumers' operations are irregular. Billets and slabs bring $30, Youngstown and Pittsburgh, and sheet bars are $29 to $30, same bases, the lower figure being based on old contracts with large users.

Cleveland—The market for sheet bars, billets and slabs is easy, with little business developing. Nominal quotations are $29 to $30, base, Cleveland and Youngstown, O., for sheet bars, and $30 for billets and slabs.

Wire

Demand Steady at Low Rate and Prices Show no Change—Nails From Stock Move Better

WIRE PRICES, PAGE 91

Chicago—Manufacturers' wire is scheduled at about the same rate as April. Shipping orders are meeting expectations. Wire nails are $1.95 to $2.05 to jobbers, while plain wire is being quoted generally at 2.25c, Chicago or western mills. Woven fencing business, while still below last spring, is fairly encouraging, particularly in the northwest. Jobbers are moving wire nails more actively than for some weeks.

Worcester, Mass.—With the summer lull just ahead wire production is beginning to taper although the decline in production is slight. January, February and March showed an advance over November and December. The automobile market is still active in demand and the building trades are providing outlets.

New York—Demand for wire products is sluggish, with nails moving at $1.90, Pittsburgh, and plain bright wire at 2.20c, Pittsburgh. Jobber demand is said to be at a standstill.

Buffalo—Wire works are operating at 75 per cent of capacity. Incations point to a continuation of the improved business which has been noted here during the past few weeks.

Pittsburgh—Specifications for wire products continue restricted as the result of the heavier buying noted the latter part of March. Shipments against these orders will accommodate requirements of buyers for some time ahead and in most cases there has been little occasion to make new commitments. New business is being received at a range of prices, with wire nails $1.90 to $2 to jobbers, plain wire 2.20c to 2.30c and wire rods $35 to $37.

Cleveland—Little change is noted in specifications for wire and wire products. Demand is fair to steady, fairly well distributed between manufacturers and jobbers. Business is keenly competed for and in several instances brings out prices ranging from first-quarter levels to the asking prices generally named for second quarter. Nails range from $1.90 to $2 a keg; plain wire to the manufacturing trade is 2.20c to 2.30c, Pittsburgh, and wire rods are quotable at a $2 a ton spread of $35 to $37, same base.

Sales of mining and industrial electric locomotives for first quarter of 1931 totaled 72, compared with 140 in the corresponding quarter of 1930. Of these 55 were mining and 17 industrial, compared with 123 and 17 in first quarter 1930.

Nut, Bolt, Rivet Volume Makes Little Change

Bolts, Nuts, Rivets Prices, Page 91

Pittsburgh—Demand for bolts, nuts and rivets is little changed from the rate of recent weeks although April specifications were slightly larger than those of March. Shipments continue fairly steady. Prices are unchanged, generally continuing 73 off for bolts and nuts and 2.75c, Pittsburgh, for structural rivets. Plant operations hold around 35 per cent.

Philadelphia — Bolt and nut demand is fair with 73 off list the usual price. Shoemaker Bridge Co., Pottstown, Pa., has closed on 300 tons of galvanized bolts for Pennsylvania railroad electrification work, order reported to have gone to a Pittsburgh mill.

Cleveland—Current business in bolts and nuts holds to satisfactory levels after April proved the fifth successive monthly gain in volume for a leading local interest, May bids fair at least to maintain this rate. Shipments are fairly even. Not much change is evident in consuming demand with all interests represented with the exception possibly of farm implement manufacturers. Discount on list continues 73 off. Rivets are likewise unchanged at 2.75c, Cleveland.

Chicago—Shipping orders for bolts and nuts are about even with April and down slightly from March. Automotive demand leads. Large structural rivets are slow, but the price holds at 2.85c, Chicago, carload lots. Producer operations remain at about 40 per cent.

Berger Iron Works Gets Government Contract

Washington—Berger Iron Works., Akron, O., has been awarded a contract for structural steel, steel floor plates and steel deck roofs by the department of justice on a bid of $8732.

Raw Material Prices

Pig Iron

Per Gross Ton

FOUNDRY, NO. 2

Chicago furnace	$17.50
Pittsburgh, dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Valley furnace	17.00
Cleveland fur., local del.	17.00
Philadelphia, delivered	17.26 to 17.76
Virginia, furnace	17.75
Granite City, Ill., fur.	17.50
Buffalo, fur., local del.	17.50
Buffalo, del. Boston	21.41 to 21.91
Buff., all-rail, Brooklyn	19.91 to 20.91
Buff., all-rail Newark	18.28 to 18.78
Ala., Bir. fur., local del.	12.00 to 13.00
Alabama, del. Chicago	17.01
Alabama, del. St. Louis	15.42
Alabama, del. Cincinnati	14.69 to 15.19
Ala., Phila., dock del.	16.25
Ala., Balt., dock del.	16.00
Alabama, New York dock	16.50
Ala., Boston dock del.	16.75
Tenn., Bir. base, local del	13.00
Tennessee, del. Cinn.	14.69 to 15.19
Montreal, delivered	23.50
Toronto, delivered	22.10

FOUNDRY, NO. 2X

Buffalo, fur., local del.	18.00
Buff., all-rail, Brooklyn	20.91 to 21.41
Buffalo, all-rail Newark	18.78 to 19.28
Buffalo, del. Boston	21.91 to 22.41
Virginia furnace	18.25
Eastern, del. Phila.	17.76 to 18.26

FOUNDRY, NO. 1X

Buffalo fur., local del.	19.00
Eastern, del. Phila.	18.26 to 18.76

MALLEABLE

Valley furnace	17.00
Cleveland fur., local del.	17.00
Pittsburgh dist. fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Chicago, furnace	17.50
Buffalo fur., local del.	18.00
Eastern Penna., delivered	18.26 to 20.91
Granite City, Ill., fur.	17.50
Montreal, delivered	24.00
Toronto, delivered	22.60

BASIC

Pittsburgh, district fur.	17.50
Pittsburgh, delivered	18.13 to 18.63
Eastern Penn., del.	17.00 to 17.25
Buffalo fur., local del.	17.00
Montreal, delivered	20.50
Valley, furnace	17.00

BESSEMER

Valley furnace	17.00
Pittsburgh, delivered	18.13 to 18.63
Pittsburgh, furnace	17.50

LOW PHOS.

Valley fur., standard	27.00
Philadelphia, standard	24.76 to 27.79
Copper-bear., E. Pa. fur.	22.50 to 23.00

GRAY FORGE

Valley furnace	16.50
Pittsburgh district fur.	17.00
Pittsburgh, delivered	17.63 to 18.13

CHARCOAL

Lake Superior, del. Chi.	27.04

SILVERY

Jackson County, O., fur., in per cents 6—$21; 7—$21.50; 8—$22; 9—$22.50; 10—$23; 11—$24; 12—$25; 13—$27.

BESSEMER FERROSILICON

Jackson County, O., fur., in per cents 10—$25; 11—$26; 12—$27; 13—$29; 14—$31; 15—$26; 16—$35.

Coke

Prices Per Net Tons

Beehive Ovens

Connellsville furnace	$2.50
Connellsville foundry	3.25 to 4.75
New River foundry	6.00
Wise county foundry	4.25 to 5.00
Wise county furnace	3.50 to 4.25

By-Product Foundry

Newark, N. J., del.	9.00 to 9.40
Chicago, ovens	7.50
New England, del.	11.00
St. Louis, del.	9.00
Birmingham, ovens	5.00
Indianapolis, del.	8.25
Ashland, Ky., ovens, Connell., basis	5.50
Portsmouth, O., ovens, Connell., basis	5.50
Buffalo, ovens	8.00 to 8.50
Detroit, ovens	8.00
Philadelphia, del.	9.00

Iron Ore

LAKE SUPERIOR ORE

Gross ton, 51½%, Lower Lake Ports

Old range bessemer	$4.80
Mesabi bessemer	4.65
Old range nonbessemer	4.65
Mesabi nonbessemer	4.50
High phosphorus	4.40

EASTERN LOCAL ORES

Cents per unit delivered at Eastern Pennsylvania and New Jersey furnaces

Foundry and basic, 56-63%, contract	10.00
Copper-free low phos. 58-65%	nom.

FOREIGN ORE

Cents per units, alongside docks Atlantic ports

Foreign manganiferous ore, 45-55% iron, 6-10% manganese	10.00
North African low phosphorus	9.00
Swedish basic, 65%	9.00
Swedish low phos.	10.00
Spanish, North African basic, 50 to 60%	9.00
Newfoundland fdy., 55%	9.00
Tungsten, spot and future short ton unit, duty paid	$11.00 to $11.50
Chrome ore, 48% net ton c.i.f.	$21.50 to 22.00

Manganese Ore

Prices, not including duty, are cents per unit; cargo lots.

Caucasian, 52-55% (nom.)	26 to 28 cents
South African, 52%	26 to 28 cents
South African, 49-51%	25 to 26 cents
South African, 44-47%	24 cents
Indian, 48-50%	nom.
Brazilian, 46-48% (nom.)	22 cents

Refractories

FIRE CLAY BRICK

Per 1000 f.o.b. Works

First Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	$40.00
Georgia, Alabama	40.00

Second Quality

Pennsylvania, Ohio, Illinois, Kentucky, Missouri, Maryland	35.00
Georgia, Alabama	30.00 to 35.00

SILICA BRICK

Pennsylvania	40.00
Joliet, Ill., East Chicago, Ind.	49.00
Birmingham, Ala.	50.00

MAGNESITE BRICK

Per Net Ton

9 x 4½ x 2½	$65.00

MAGNESITE

Dead burned grain, net ton, Chester, Pa., or Baltimore bases	40.00
Domes, Chewelah, Wash., base	22.00

CHROME BRICK

Net ton, Chester, Pa., and Baltimore base, 9 x 4½ x 2½	45.00

Semifinished Steel

PRICES PER GROSS TON

BILLETS AND BLOOMS

4 x 4-inch base

Pittsburgh, open-hearth	$30.00
Pittsburgh, bessemer	30.00
Youngstown	30.00
Cleveland	30.00
Philadelphia	35.30
Chicago	31.00
Forging, Chicago	36.00
Forging, Pittsburgh	36.00
Forging, Philadelphia	40.30

SHEET BARS

Pittsburgh	29.00 to 30.00
Youngstown	29.00 to 30.00
Cleveland	29.00 to 30.00
Chicago	31.00

SLABS

Pittsburgh	30.00
Youngstown	30.00
Cleveland	30.00

WIRE RODS

Pittsburgh, Cleveland	35.00 to 37.00
Chicago	38.00

SKELP

All grades, Pittsburgh	1.60c to 1.65c

Ferroalloys

(In dollars, except Ferrochrome)

*Ferromanganese, 78-82%, tidewater, duty paid	$85.00
*Ferromanganese, del. Pittsburgh	89.79
Spiegeleisen, 19-20%, domestic fur. spot†	80.00
Ferrosilicon, 50 per cent, freight all., c. l.	83.50
Do, less carload	88.50
Do, 75 per cent	130.00 to 150.00
Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., con., del.	11.00
Do, for spot delivery	11.50
Ferrotungsten, stand., lb. cont.	1.10 to 1.15
Ferrovanadium, 30-40 per cent, per lb., contained, on analysis	3.15 to 3.65
Ferro-carbon-titanium carload producers' plants, net ton	150.00
Do, one-ton to c. l.	170.00
Ferrophosphorus, per ton, carload 17-19 per cent, Rockdale, Tenn., basis (18 per cent)	91.00
Ferrophosphorus, electrolytic per ton carload, 23-25% f.o.b. Anniston, Ala., 24%	122.50

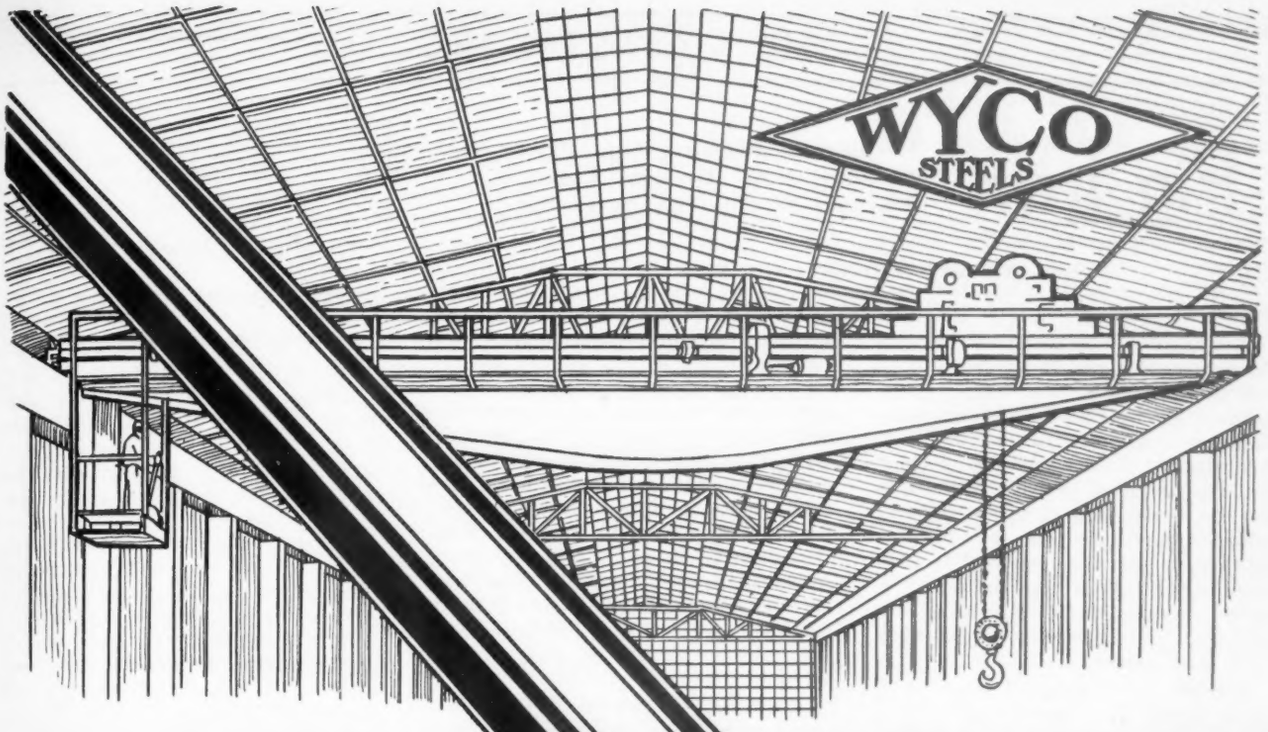
†Carloads. Differentials apply to large quantities.

*To users of carloads to 500 tons annually. Differentials apply to users of larger quantities.

Fluorspar

85 and 5 per cent grade

Washed gravel Kentucky and Illinois mines, per net ton	$13.50 to 14.00
Washed gravel, import duty paid east, tide, gross ton	19.00



SHAFTING

Standard and Special Analysis

COLD DRAWN

Turned and Polished

WYCKOFF DRAWN STEEL COMPANY

General Offices:
FRICK BLDG., PITTSBURGH, PA.

Mills at:
AMBRIDGE, PA. and CHICAGO

Sales Offices:

BOSTON—627 New C. of C. Bldg.
ST. LOUIS—Planters Bldg.
CLEVELAND—Rockefeller Bldg.
BUFFALO—Ellicott Square
DAYTON—1128 The 3rd Nat'l Bldg.
MILWAUKEE—288 E. Water St.
PHILADELPHIA—133 So. 36th St.
DENVER—1037 U. S. Nat'l Bank Bldg.
MINNEAPOLIS—332 Builders Exchange

Chicago Office: 3200 So. Kedzie Ave.
Detroit Office and Warehouse: 6189 Hamilton Ave.

Pacific Coast Representatives: F. H. Currie, 309 Pacific Mutual Bldg., Los Angeles, Cal.

Pig Iron

Shipments Holding Up—Prices Steady—New Orders Light—Furnace Stocks Are Increasing

PIG IRON PRICES, PAGE 102

Pittsburgh—New business in the pig iron market continues at the dull rate of the past several weks. Shipments after holding steady for some time are beginning to decline, now being lighter than production. Orders still are restricted to small lots which provide little test of prices. Westinghouse Electric & Mfg. Co.'s inquiry for various plants is expected to give some indication of the market. Producers usually quote $17, base, valley, for No. 2 foundry, malleable, basic and bessemer.

Boston—The week's sales, 600 tons, were the lowest in many months. No inquiries are pending. Prices are untested.

New York—Pig iron buying has fallen off, sales here in the week aggregating not more than 3000 tons. Fresh inquiry is described by some sellers as the lightest in their experience. Buffalo iron is $15 to $16, furnace, and southern iron, $11, furnace. Eastern Pennsylvania iron appears slightly firmer, although there is little to afford a test.

Philadelphia—The Newport News Shipbuilding & Dry Dock Co. is inquiring for 510 tons of No. 1X, with phosphorus 0.25 to 0.5 per cent, and for 100 to 200 tons of No. 1X with phosphorus 0.5 to 0.8 per cent, for delivery by June 8. Otherwise the market for pig iron is dull. Prices generally are unchanged.

Buffalo—Producers report small inquiries and sales of pig iron. No inquiry of sufficient size to test prices has appeared. Four furnaces continue in operation.

Youngstown, O.—Small lots of foundry and malleable pig iron moving to miscellaneous foundries from local blast furnaces continue to supplement the larger tonnage flowing in molten state to adjacent ingot mold plants. No. 2 foundry, malleable, bessemer and basic grades hold at $17, valley.

Cleveland—Consumers continue to buy on a month-to-month basis. Inquiries are more numerous, but the volume shows little change. More melters in southern Ohio and Indiana are in the market. The Westinghouse Electric & Mfg. Co. has not yet closed on requirements for Cleveland and Trafford City, Pa. A Dayton, O., foundry purchased 1000 tons. Sales by furnace interests with headquarters in Cleveland amounted to 9000 in the past week. April shipments in aggregate fell slightly behind those of March, mainly due to curtailment by automotive foundries, and the movement to one large northern Ohio steelmaker. A leading merchant furnace interest reports stocks heavy; shipments could increase considerably without requiring any improvement in production. Cleveland furnaces hold to $17, base, for local delivery, and $16 for outside shipment. The lake furnace price for western and southern Ohio and Indiana continues $16 to $17, base.

Cincinnati—After a brief spurt sales of pig iron have reverted to a rate of about 2000 tons a week. A southern Ohio melter purchased 500 tons. Inquiries by Ohio foundries for 500 tons and 300 tons of northern iron are pending.

Chicago—Automotive foundries are ordering most of the pig iron that is being shipped. Schedules indicate May deliveries to automotive plants will equal those of April. Chicago district foundry operations are barely at 35 per cent. Northern iron buyers appear indifferent to prices, ordering small lots as needed without shopping. Pig iron sales offices are reducing their overhead because of the light sales volume and negligible forward contracting.

St. Louis—Pig iron shipments in this district in April were slightly smaller than in March, and considerably below the average for April in the past ten years. The outlook for May is brighter, and it is expected the April deficiency will be made up this month. Furnace interests report a substantial increase, as consumers' stocks are low. The current market is quiet, but makers are holding to price schedules.

Birmingham, Ala.—The volume of sales is falling short of production, eight furnaces making foundry iron, four basic, and one a special brand. The base price is steady at $12 to $13 for local shipment, and $11 in outside competitive areas.

Toronto, Ont.—New business is restricted to small, spots lots, the aggregate for the past week about 1000 tons. Shipments, however, are running 20 per cent higher in volume than earlier in the year.

Mahan Foundry Co., Miami Chapel road and Baltimore & Ohio railroad, Dayton, O., has changed its name to the Edgemont Castings Co.

Ferroalloy Orders Small; Specifications Decline

Ferroalloy Prices, Page 102

New York—Ferromanganese shipments are in line with the slightly slower tendency in steel mill operations. The market is unchanged at $85, duty paid, in carload lots. Domestic spiegeleisen, 19 to 21 per cent, is nominally $30, furnace, in carloads, with shipments showing little change. Spot demand for foreign spiegeleisen is lacking, although a little is being received on contracts. In March appoximately 350 tons arrived in this country, compared with about 150 tons in February. The market on foreign material is nominal.

Pittsburgh—Shipments of ferroalloys continue in small lots with the trend in business still downward. April specifications reflected the decline in steelmaking operations, being smaller than in March. Spot buying is light with prices unchanged. Ferromanganese continues $89.79, delivered, for small lots with spiegeleisen $30, furnace. Prices of other ferroalloys are steady.

Iron Ore Sales Are Lacking; Shipments Slow

Iron Ore Prices, Page 102

Cleveland—Producers of Lake Superior iron ore say consuming interests with which they have long-term contracts are accepting the renewal of last year's prices without protest. Inquiries fail to reveal any important open market business since the Ford Motor Co. closed two weeks ago. Some consumers generally buying in the open market indicate they are not in need of ore now. Shipments are not yet under way in volume. Vessel shipments in April totaled 175,921 tons, 68,362 tons more than in the month last year, the increase having no special significance. Vessel rates have not been established for the season.

New York To Buy Castings

New York—Bids will be taken May 11 by the department of purchase for the department of water supply, gas and electricity, on 1480 lamp post pedestal castings, 1440 columns and 1480 sleeves, approximately 500 tons.

Scrap

Further Decline in Prices Follows Heavy Supply and Limited Buying—Resistance Is Strong

Chicago—Heavy railroad offerings, limitations on deliveries to large melters, and further forced liquidation of speculative stocks of steel scrap again have increased the visible supply and weakened prices of some leading grades 25 to 50 cents. These reductions are in the face of a broader resistance to pressure by sellers in the hope they can keep melting steel at or above $9. Melting steel remains at $9.25 to $9.75 on actual sales, the latest consumer order having been at the top of that spread. Nevertheless, dealers have been buying at $9 to fill shipping orders, and melting steel on the St. Paul and Chicago & North Western lists closed at about $9.30, gross, delivered in the Chicago switching district. Several offers of cast borings

Iron and Steel Scrap Prices

Corrected to Tuesday noon. Gross tons delivered to consumers, except where otherwise stated.

HEAVY MELTING STEEL

Birmingham	9.00 to 10.50
Boston, dealers	6.00 to 6.25
Buffalo, No. 1	10.50 to 11.00
Buffalo, No. 2	9.00 to 9.50
Chicago	9.00 to 9.50
Cinci., deal.	8.75 to 9.25
Cleve., No. 1	9.75 to 10.00
Cleve., No. 2	9.25 to 9.50
Det., No. 1 deal.	8.25 to 8.75
Det., No. 2 deal.	7.00 to 7.50
E. Pa. del. mill	10.00 to 10.50
N. Y. deal. R. R.	6.50 to 7.00
N. Y. deal. No. 2	5.00
N. Y. deal. yd.	5.00
Pitts., No. 1	11.25 to 11.75
St. L. No. 1 sel.	8.75 to 9.25
Federal, Ill.	8.25 to 8.75
Granite City, Ill.	7.75 to 8.25
Valleys, No. 1	11.25 to 11.75

COMPRESSED SHEETS

Buffalo, dealers	9.00 to 9.50
Chicago	7.25 to 7.75
Cleveland	8.50 to 8.75
Detroit, dealers	8.00 to 8.50
E. Pa. new mat.	9.00 to 10.00
Pittsburgh	11.50 to 12.00
Valleys	10.75 to 11.25

BUNDLED SHEETS

Buffalo	6.75 to 7.25
Cinci., deal.	8.25 to 8.75
Cleveland	7.00 to 7.25
Eastern Pa.	8.50
Pittsburgh	9.50 to 10.00
St. Louis	5.50 to 6.00

SHEET CLIPPINGS LOOSE

Chicago	4.00 to 4.50
Cincinnati	4.75 to 5.25
Detroit, dealers	4.50 to 5.00
St. Louis	5.50 to 6.00

STEEL RAILS SHORT

Birmingham	12.00 to 12.50
Boston, dealers	5.00 to 6.25
Buffalo	13.75 to 14.25
Chicago (3 ft.)	10.50 to 11.00
Chicago (2 ft.)	11.25 to 11.75
Cinci., deal	13.25 to 13.75
Detroit, deal.	11.50 to 12.00
Pitts. (open-hearth, 3 ft and less)	14.00 to 14.50
St. Louis	12.00 to 12.50

STOVE PLATE

Birmingham	8.00 to 8.25
Boston, con.	8.00 to 8.50
Buffalo	8.75 to 9.00
Chicago, net	7.00 to 7.50
Cinci., deal. net	5.00 to 5.50
Det., net deal.	5.50 to 6.00
Eastern Pa.	8.50
N. Y., deal. mill	4.75
St. Louis	7.00 to 7.50

COUPLERS, SPRING

Buffalo	13.50 to 14.00
Chicago	10.00 to 10.50
Eastern Pa.	15.50 to 16.00
Pittsburgh	15.00 to 15.50
St. Louis	9.00 to 9.50

ANGLE BARS—STEEL

Chicago	9.75 to 10.25
St. Louis	8.50 to 9.00

LOW PHOSPHORUS

Buff., billets and bloom crops	15.00 to 15.50
Cleveland bil. and bloom crops	14.00 to 14.50
Eastern Pa.	15.50 to 16.00
Pittsburgh billet bloom crops	17.00 to 17.50
Pitts. sheet bar crops	16.50 to 17.00

FROGS, SWITCHES

Chicago	9.50 to 10.00
St. Louis	9.00 to 9.50

SHOVELING STEEL

Chicago	9.25 to 9.75
Cleveland	6.25 to 6.75
St. Louis	8.00 to 8.50

RAILROAD WROUGHT

Birmingham	8.00 to 9.00
Boston, dealers	8.00 to 8.50
Buffalo, No. 1	8.00 to 8.50
Buffalo, No. 2	10.50 to 11.00
Chicago, No. 1	8.50 to 8.95
Chicago, No. 2	9.25 to 9.75
Cinci., No. 2	8.75 to 9.25
Eastern Pa.	11.00
N. Y., No. 1, deal.	9.50 to 10.00
Pitts., No. 2	12.00 to 12.50
St. Louis, No. 1	6.50 to 7.00
St. Louis, No. 2	8.25 to 8.75

SPECIFICATION PIPE

Boston	5.00 to 5.50
Eastern Pa.	11.50 to 12.00
N. Y., deal.	6.50 to 7.25

BUSHELING

Buffalo, No. 1	9.00 to 9.50
Chicago, No. 1	7.00 to 7.50
Cinn., No. 1 dl.	7.00 to 7.50
Cinn., No. 2	4.00 to 4.50
Cleve., No. 2	6.00 to 6.50
Det., No. 1 new deal.	6.50 to 7.00
St. L., No. 1	6.00 to 6.50
Val. new No. 1	10.00 to 10.50

MACHINE TURNINGS

Birmingham	6.00 to 6.50
Boston, dealers	2.00 to 2.25
Buffalo	4.75 to 5.00
Chicago	3.75 to 4.25
Cinn., deal.	4.50 to 5.00
Cleveland	4.00 to 4.50
Detroit	3.00 to 3.50
Eastern Pa.	6.50
N. Y., deal.	3.00
Pittsburgh	7.00 to 7.50
St. Louis	4.00 to 4.50
Valleys	7.00 to 7.25

BORINGS AND TURNINGS For Blast Furnace Use

Boston	1.75 to 2.00
Buffalo	5.50 to 6.00
Cinn., deal.	4.50 to 5.00
Cleveland	6.25 to 6.75
Detroit, deal.	3.50 to 4.00
Eastern Pa.	6.00 to 6.50
N. Y., deal.	3.00
Pittsburgh	7.50 to 8.00

CAST IRON BORINGS

Birming., chem.	12.50 to 13.00
Birming., plain	6.00 to 6.50
Boston, chem.	9.10 to 9.60
Boston, deal.	2.00 to 2.25
Buffalo	5.50 to 6.00
Chicago	3.75 to 4.25
Cinn., deal.	4.50 to 5.00
Cleveland	6.25 to 6.75
Detroit, deal.	3.50 to 4.00
Eastern Pa.	6.50 to 7.00
E. Pa., chem.	13.50 to 14.50
N. Y., deal.	3.00
Pittsburgh	7.50 to 8.00
St. Louis	5.50 to 6.00

PIPE AND FLUES

Cinn., deal.	7.50 to 8.00

RAILROAD GRATE BARS

Buffalo	7.25 to 7.75
Chicago, net	6.00 to 6.50
Cincinnati	6.00 to 6.50
Eastern Pa.	8.50 to 9.00
N. Y., deal.	5.00 to 5.50
St. Louis	6.00 to 6.50

FORGE FLASHINGS

Boston, deal	5.00 to 5.25
Buffalo	9.00 to 9.50
Cleve. ov. 10 in.	7.25 to 7.75
Detroit	6.50 to 7.00

FORGE SCRAP

Boston, del.	5.00 to 5.25
Chicago	11.50 to 12.00
Eastern Pa.	10.00 to 10.50

ARCH BARS, TRANSOMS

Chicago, net	10.50 to 11.00
St. Louis	9.75 to 10.25

AXLE TURNINGS

Boston, deal.	6.75 to 7.00
Buffalo	9.25 to 9.75
Chi., steelworks	7.50 to 8.00
Cleveland	8.00 to 8.50
Eastern Pa.	10.50 to 11.00
Pittsburgh	10.00 to 10.50
St. Louis	7.00 to 7.50

STEEL CAR AXLES

Birmingham	13.00 to 13.50
Boston, ship. pt.	11.00 to 12.00
Buffalo	15.50 to 16.00
Chicago	13.45 to 14.00
Eastern Pa.	18.50 to 19.50
St. Louis	12.50 to 13.00

SHAFTING

Bos., ship. pt.	10.00 to 10.50
Chicago	9.55 to 10.10
N. Y., deal.	13.00 to 14.00
St. Louis	10.25 to 10.75
E. Penna.	18.00

CAR WHEELS

Birming., iron	10.00 to 10.50
Boston, iron	14.00 to 14.50
Buffalo, iron	12.00 to 12.50
Buffalo, steel	13.50 to 14.00
Chicago, iron	9.25 to 9.75
Chi., roll steel	11.50 to 12.00
Cincinnati, iron	10.50 to 11.00
E. Pa. steel	14.50 to 15.00
E. Pa. iron	13.00 to 13.50
Pitts., iron	13.00 to 13.50
Pitts., steel	15.00 to 15.50
St. Louis, iron	8.00 to 8.50
St. Louis, steel	10.50 to 11.00

NO. 1 CAST SCRAP

Birmingham	10.00 to 10.50
Buffalo (mach.)	10.50 to 11.00
Boston, textile	10.00 to 10.50
Chicago, mach.	9.80 to 10.35
Chi., railroad	8.70 to 9.25
Chicago, agri.	8.40 to 8.95
Cinn., mach. cup, gross	12.25 to 12.75
Cleve. cupola	12.00 to 12.50
Det., net deal.	8.50 to 9.00
E. Pa. cupola	13.00
N. Y. cup deal.	8.00 to 8.50
N. Y., del. local foundries	12.00
Pitts., cupola	11.50 to 12.00
San Fran., del.	13.50 to 14.00
Seattle	7.50 to 8.00
St. L. No. 1 ma.	9.00 to 9.50
St. L. No. 1	8.50 to 9.00

HEAVY CAST

Boston	10.50 to 11.00
Bos. mach. cast.	11.50 to 12.50
Buffalo, break	7.50 to 8.00
Cleve., break	6.50 to 7.00
Detroit, auto, net deal.	10.50 to 11.00
Det., break., dl.	6.50 to 7.00
Eastern Pa.	11.00
N. Y. No. 1 dl.	8.00 to 8.50
N. Y. break. dl.	7.00 to 7.50
Pittsburgh	8.50 to 9.50

MALLEABLE

Boston R. R.	13.00 to 13.50
Buffalo	11.50 to 12.00
Chicago, agri.	9.00 to 9.50
Chicago, R. R.	10.25 to 10.75
Cinn., R. R. dl.	11.50 to 12.00
Cinn, agri., dl.	12.00 to 12.50
Cleveland, rail	12.00 to 12.50
Det. auto deal.	10.50 to 11.00
St. Louis, rail	9.00 to 9.50

RAILS FOR ROLLING 5 feet and over

Birmingham	10.25 to 10.75
Boston	7.50 to 8.00
Buffalo	10.75 to 11.25
Chicago	11.50 to 12.00
Eastern Pa.	12.50 to 13.00
New York	8.50 to 9.00
St. Louis	10.25 to 10.75

LOCOMOTIVE TIRES

Chicago, cut	11.50 to 12.00
St. L., No. 1	10.50 to 11.00

LOW PHOS. PUNCHINGS

Chicago	10.75 to 11.25
Buffalo	14.00 to 14.50
Eastern Pa.	14.50 to 15.00
Pittsburgh	14.50 to 15.00

Stairway of Mitco Shur-Site Stair Treads in the new Jersey City coal pocket.

Trench coverings of Mitco Driveway Grating in the new Jersey City coal pocket, possessing all the strength necessary to support heavily loaded coal trucks.

Walkways of Mitco Grating in the new Jersey City coal pocket. Mitco's rectangular openings are free from acute angles that would retard the passage of pieces of coal and thus present tripping and slipping hazards.

Maybe You'll Never Build A Coal Pocket

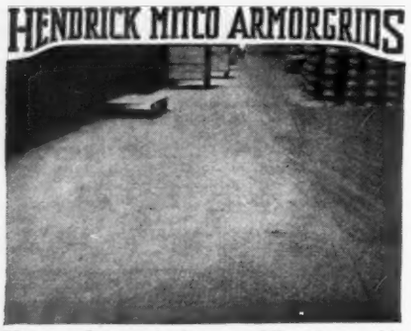
. . . *But You* Can *Take a Tip from the Engineers of The D. L. & W. Coal Co.*

A NEW and modern coal pocket, one of the finest of its kind, was designed and constructed in 1930 under the supervision of the engineers of The Delaware, Lackawanna & Western Coal Co.

Located at 679 Henderson Street, Jersey City, the new coal pocket is operated by Burns Brothers. The pocket is said to be the first of its type in which grating was employed for walkways . . . . . and the grating selected by the D. L. & W. engineers was Mitco. Installation was made by Ferguson-Phin Iron Works of Jersey City.

3,400 square feet of Type C Mitco Interlocked Steel Grating (with 1″ rectangular openings) were employed in the walkways, as shown in the illustration. Mitco Type C Driveway Grating was used in trench coverings, over which loaded trucks pass. Mitco Shur-Site Stair Treads were installed on the stairways.

Coal pockets or central stations . . . . . warehouses or waterworks . . . . . wherever open steel flooring is required, Mitco Grating and Mitco Treads are ideal. They are high in strength and rigidity, have non-slipping and non-clogging surfaces, and provide maximum light and ventilation. May we send you a copy of the Mitco bulletin?



Wherever floor service is severe, Mitco Armorgrids prevent crack-outs, reduce maintenance and give longer life to the structure. They are easily and economically installed. Write for bulletin.

HENDRICK MFG. CO.

43 Dundaff Street, Carbondale, Pa.

New York Office, 15 John St.
'Phone: COrtlandt 7-2440

Baltimore, Md.; Birmingham, Ala.; Boston, Mass.; Charleston, W. Va.; Chicago, Ill.; Cleveland, Ohio; Detroit, Mich.; Erie, Pa.; Hazleton, Pa.; Houston, Tex.; Indianapolis, Ind.; Los Angeles, Cal.; Montreal, Can.; Philadelphia, Pa.; Pittsburgh, Pa.; San Francisco, Cal.; Seattle, Wash.; Tulsa, Okla.

Makers of Mitco Shur-Site Treads, Hendrick Perforated Metal Screens and Elevator Buckets, Hendrick Perforated Metal Grilles, and Light and Heavy Steel Plate Construction.

HENDRICK MITCO GRATING

The Grating With Every Advantage

High Strength—Permanent Rigidity—Non-Slipping, Non-Clogging Surface—Maximum Light and Ventilation

are at $3.50, delivered Chicago, while at least one dealer is quoting as low as $7 for factory compressed sheets. A moderate improvement in demand for rerolling rails is expected because of reduced inventories of rolling mill interests, whose demand for road surfacing bars has increased.

Boston—Conditions in the scrap market show no change. One or two consumers continue to take limited lots of heavy melting steel. Pittsburgh mills are taking nothing from this center. Turnings, axles, shafting, pipe and rerollers were quoted lower in the past week.

New York—Movement of scrap to Buffalo by barge continues active. Eastern Pennsylvania mills are taking limited shipments at $10 for No. 1 heavy melting scrap, delivered. Reports of shading of this price are not confirmed. Dealers are reported to have paid $6.25 to $6.50 for No. 2 for Buffalo shipment and $7.50 for No. 1. Dealers' buying prices are generally lower. Rails for rolling are off 50 cents.

Philadelphia—Steel and iron scrap is listless with several grades quoted lower. Stove plate is lower on a recent purchase for Florence, N. J. The Pennsylvania railroad has opened bids on 28,000 tons, including 12,000 tons of heavy melting steel. As this road has refused to dispose of monthly offerings for some time bids may not be accepted.

Pittsburgh—Scrap prices are off sharply on sale of a moderate tonnage of heavy melting steel at $11.50, against a former top of $12.50, although it is doubtful if large lots could be obtained at this figure. There is little activity in other grades and a number of prices are nominally lower. Blast furnace grades are firm as the result of recent heavy buying.

Buffalo—A local steelworks has purchased a fair tonnage of No. 2 heavy melting steel, paying about $9.25 a ton delivered. This supplements other recent purchases here at or near this price. Otherwise the market is without feature.

Cleveland—Iron and steel scrap quotations remain unchanged but are largely nominal. No mill purchases have been made and dealer trading is at a standstill. Some scrap is moving to one mill yard but this amounts simply to a storage plan, since the material will not be paid for until consumed. Foundries take an occasional car of scrap but total consumption is negligible. Some No. 2 bundles are moving to Youngstown. An Erie, Pa., consumer is taking machinery cast.

Otherwise shipment of scrap from this district is slight.

Detroit—Further slight declines have been registered in No. 1 busheling, forge flashings, compressed sheets, loose sheet clippings and stove plate but general opinion is that the scrap market is near the bottom. Local consumers, with stocks large, are virtually out of the market. Shipments to Buffalo are light. Ford Motor Co. is selling little scrap in the open market and is using its lighter grades. Automobile manufacturers are moving their scrap each month as they have no storage facilities. Output of scrap in this district in May is expected to approximate the April level.

Cincinnati—Dealers in iron and steel scrap are marking time in the face of dull demand, which has accounted for another decrease in quotations. Prices are off 25 to 50 cents a ton on No. 1 and No. 2 busheling, machinery and railroad cast, grate bars, pipes and flues, short rails, stove plate and No. 1 locomotive tires.

St. Louis—Slightly more activity is noted in the iron and steel scrap market. Mills and foundries are taking small prompt tonnages, and one interest acquired a round tonnage of steel for delivery through the rest of this quarter. Several items are showing resistance and transactions have been at the top of the range.

Dealers are anticipating heavier shipments to customers during May than in April. In a number of cases this view is based on actual specifications.

Birmingham, Ala.—A little heavy melting steel was moved recently but the scrap market is slow and prices low.

Toronto, Ont.—Demand for iron and steel scrap is spotty. Machinery cast continues active, but other grades listless. Demand for heavy melting steel is small. Trade between dealers is mostly in small lots. Price lists are unchanged.

Canadian Scrap

Dealers' Buying Prices

MONTREAL

Per Gross Ton

Iron axles	$11.00
Steel axles	10.00
Car wheels	8.00
Stove plate	8.00
Wrought pipe	2.00
Turnings	2.00
Heavy melting steel	6.00

TORONTO

Steel axles	7.00
Iron axles	7.00
Heavy melting steel	7.00
Turnings	2.00
No. 1 mach. cast (net)	9.00
Malleable (net)	7.00

Coke

By-Product Foundry Grade Is Reduced 50 Cents at Chicago—Beehive Market Continues Dull

COKE PRICES, PAGE 102

Pittsburgh—Beehive foundry coke requirements are slipping slowly, with little change noted in shipments of the furnace grade on contracts. New buying of furnace coke is light; the standard grade continues $2.50. Foundry coke prices are unchanged.

Boston—Demand for foundry coke is at a standstill. Dealers have found their principal market in the domestic field and are planning a vigorous sales campaign in the next few months.

Detroit—By-product foundry coke is moving moderately well, with the market $8, base, Detroit, or $8.50, delivered Detroit.

New York—Spot demand for beehive coke, restricted for many months, is at low ebb. A buyers' market prevails, with standard grades of furnace holding around $2.25, and standard grades of foundry $3.25, Connellsville, Pa. Premium grades of foundry beehive coke are $4.70 to $4.85, Latrobe, Pa. By-product coke is $9 to $9.40, Newark, N. J.; $11, New England; and $9, Philadelphia.

Cincinnati—Shipments of by-product foundry coke remain at low levels. Quotations are unchanged.

Chicago—By-Product foundry coke prices have been reduced 50 cents, making the price at Chicago ovens $7.50. The delivered price in the Chicago switching district is $8.25. Oven stocks are heavy and production is being reduced.

St. Louis—Shipments of metallurgical coke continue in small volume, the April total falling below that of March. Foundry requirements do not give indications of expansion in May. Prices are steady.

Birmingham, Ala.—By-product coke prices are a little easier, though makers have not changed their quotations. The market is quiet.

Pacific Coast

Hetch Hetchy Pipe Plate Tonnage Leads in Interest—California Cast Pipe Sales Largest in Several Weeks—Seattle Warehouse Quotations Revised Downward—Water Lines Competing

San Francisco—(*By Air Mail*)—Activity in Pacific Coast markets is far from pronounced and few awards of importance were reported this week. Interest continues to center around the opening of bids on the 35,000-ton plate pipe line for the Hetch Hetchy project.

Bars, Plates and Shapes

Demand for mild steel bars is confined to unimportant lots, while prices continue at 2.05c to 2.10c, c.i.f. Concrete bar awards aggregated 1074 tons, bringing the total for the year to 20,273 tons, as compared with 15,529 tons for the corresponding period in 1930. Soule Steel Co. booked 300 tons for the *Times-Mirror* building in Los Angeles. Unnamed companies were awarded 138 tons for highway work in Los Angeles county, Calif., and 305 tons for a bridge over the San Dieguito river in San Diego county, Calif. Bids have just been opened on 4000 tons for the Sixth street bridge, Los Angeles, and on 108 tons for a bridge over the Eel river, Humboldt county, Calif. New inquiries include 220 tons for highway work in Sacramento county, Calif. Out-of-stock prices in the San Francisco district continue unchanged at 2.60c, base, on carload lots. Los Angeles prices are firm at 2.50c, base.

Plate awards so far this year total 63,150 tons, compared with 20,179 tons for the same period a year ago. No award has yet been made on the San Francisco pipe line project calling for 880 tons of plates. Prices are weak at 2.00c, c.i.f.

Structural awards aggregated 1175 tons and brought the total for the year to 28,570 tons, as compared with 34,922 tons for the corresponding period in 1930. The largest lot was secured by the Minnesota Moline Power Implement Co., 350 tons for a bridge over the San Roqul river in Santa Barbara county, Calif. Bids have been opened on 1200 tons for the Sixth street bridge, Los Angeles, on 303 tons for a bridge over the Eel river, Humboldt county, Calif., and on 300 tons for the Islais creek bridge, San Francisco. Plain shapes range from 2.05c to 2.15c, base, c.i.f.

Other Finished Material

Bids have been postponed until May 13 for two floating derricks for Mare Island and San Diego, involving 300 tons of plates. Bids will be opened June 10 for one 30-ton electrically operated jib crane for the navy department in Pearl Harbor. One of the largest orders for drill steel ever placed went to the Crucible Steel Co. and involved 1200 tons for the Hoover Dam project.

Awards of cast iron pipe were the largest in over nine weeks and aggregated 3697 tons, bringing the total for the year to 31,931 tons, compared with 39,920 tons for the same period last year. The American Cast Iron pipe Co. booked 1320 tons, National Cast Iron Pipe Co. 167 tons, Pacific States Cast Iron Pipe Co. 999 tons, and United States Pipe & Foundry Co. 410 tons for Los Angeles.

Sheets continue to move in small lots only and from present indications no large movement is likely during the remainder of first half. Prices remain unchanged at 3.50c, base, c.i.f., on galvanized sheets, 3.00c, on black sheets, and 2.50c, base, c.i.f., on blue annealed sheets.

Coast Pig Iron Prices

Utah basic	$22.00 to 24.00
Utah foundry	22.00 to 24.00
*German	24.25
*Indian	22.00 to 24.00

*C.i.f. duty paid.

Warehouse Prices Down

Seattle — Downward revision of warehouse quotations, adjusting them to mill prices, featured the market this week. The new schedule was adopted by Seattle dealers and will likely be approved by Portland jobbers within a short time. Sheets were reduced 25 cents; bars, shapes, plates, angles and channels, 15 cents; hoops and shafting, 25 cents, and bands, 65 cents.

Further readjustment of steel rates on the intercoastal berth are noted, as the contending lines struggle to get their share of mill business. Two of the "B" lines have adopted a 20-cent base rate, while the "A" lines are working on a rate of 22 cents. However, the latter are practically competing on the same level, as they are said to be absorbing the 2-cent rail differential in their 22-cent rate from Philadelphia, thus equalizing the rail differential between the Pittsburgh district and Baltimore and Philadelphia. Recent rate reductions have not developed any new business and westbound cargoes continue slack.

Bars, Plates and Shapes

Mill prices remain stationary, merchant bars, 2.15c; shapes, 2.05c; plates, 2.00c. Demand for reinforcing material is slack. The largest job up for figures is the United States marine hospital, Seattle, tonnage unstated. Award of 135 tons for the Renton school is pending.

Aberdeen, Wash., is considering bids for a pipe line improvement, involving 20,300 feet of 28-inch pipe, approximately 1000 tons, steel, wood or cast iron. Ten tenders were submitted. Award of 100 tons of sheet steel piling for a cofferdam at the Ford plant, Seattle, is not yet announced. Reinforced piling will be used at the Renton school, eliminating an inquiry for 200 tons of steel. One hundred tons of miscellaneous items, plates, shapes, bars, castings and sheet copper, are involved in the first unit of Seattle's reservoir project, bids May 1. A later contract will call for considerable steel pipe. Bids for four steel barges for the United States engineers were opened at Portland.

Structural specifications are developing slowly and nothing of importance is up at the moment. Wallace Bridge & Structural Steel Co., Seattle, took the contract to fabricate 120 tons of light ornamental structurals for the Ford Seattle plant. It is reported that an unnamed interest has taken about 300 tons for the Cape Creek bridge, Lane county, Oregon, through John K. Holt, Salem, Oreg., general contractor.

Finished Materials

April shows a less volume of turnover than March according to Seattle jobbing houses. Spring buying has been below normal and little interest is being shown in items usually in good demand at this season. Business continues in small tonnages. Under the readjusted schedule adopted by Seattle warehouses the following prices are now effective: Steel and reinforcing bars, 3.00c; shapes and plates, 3.00c; black sheets, 4.25c; galvanized, 4.75c; blue, 3.75c; bands, 3.50c; hoops, 4.90c; shafting, 4.50c.

Old Materials

The market is unchanged both as to prices and supply. Local mills have ample material on hand and even at present low prices are receiving good quality. Export demand is absent and local dealers report very little inquiry for any kind of scrap.

Steel, Wrought and Cast Iron Pipe, and Tubing

Welded Iron, Steel Pipe

Base Price $200 Ton

Base Discounts on steel pipe, Pittsburgh and Lorain, O., to jobbers in carloads. Indiana Harbor, Ind., and Evanston, Ill., 2 points less. Chicago del.. 2½ points less. Wrought pipe, Pittsburgh base.

BUTT WELD

	Steel			Iron	
In.	Blk.	Gal.	In.	Blk	Gal.
⅛	58	44½	½	23	5
¼	62	50½	¾	28	11
1—3	64	52½	1 and 1¼	31	15
			1½ and 2	35	18

LAP WELD

2	57	45½	2	23	9
2½—6	61	49½	2½—3½	28	13
7—8	58	45½	4—6	30	17
9—10	56	43½	7 and 8	29	16
11—12	55	42½	9—12	26	11

BUTT WELD

Extra strong, plain ends

⅛	55	44½	¼ & ⅜	+13	+48
¾	60	49½	½	23	7
1—1½	62	51½	¾	28	12
2—3	63	52½	1—2	34	18

LAP WELD

Extra strong, plain ends

2	55	44½	2	29	13
2½—4	59	48½	2½—4	34	20
4½—6	58	47½	4½—6	33	19
7—8	54	41½	7 and 8	31	17
9—10	47	34½	9—12	21	8
11—12	46	33½			

To large jobbers these discounts on steel pipe increased on black by 1 point and two discounts of 5 per cent; on galvanized by 1½ points with two 5 per cents. On iron pipe large jobbers obtain additional discount of 1 point with 5 and 2½ per cent on black and galvanized. Direct mill shipments, base, plus two 5's.

BOILER TUBES

Carload Discounts, Lap Welded Steel		f.o.b. Pittsburgh Charcoal Iron	
2—2¼	38	1¾	8
2½—2¾	46	2—2¼	13
3	52	2½—2¾	16
3¼—3¾	54	3	17
4	57	3¼—3½	18
4½—6	46	4	20
1½	1	4½	21

On lots of a carload or more, above base discounts subject to preferential of two 5 per cent discounts on steel and 10 per cent on charcoal iron. Smaller quantities subject to following modifications from base discounts.

Lap Welded Steel—Under 10,000 pounds, 6 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and one 5 per cent; on 10,000 pounds to carload, 4 points under base and two 5 per cents. Charcoal Iron—under 10,000 pounds, 2 points under base; on 10,000 pounds to carload, base and one 5 per cent.

STANDARD COMMERCIAL SEAMLESS BOILER TUBES

COLD DRAWN

1	61	3	46
1¼—1½	53	3¼—3½	48
1¾	37	4	51
2—2¼	32	4½, 5, 6	40
2½—2¾	40		

HOT ROLLED

2—2¼	38	3¼—3½	54
2½—2¾	46	4	57
3	52	4½, 5, 6	46

Subject to 5 per cent supplementary discount for carload lots. On less than 10,000 pounds, base discount reduced 6 points. On 10,000 pounds to carload, base discount reduced 4 points and one 5 per cent allowed. No extra for lengths up to and including 24 feet. Sizes smaller than 1 inch and lighter than standard gage to be held at mechanical tubes list and discount. Intermediate sizes and gages not listed take price of next larger outside diameter and heavier gage.

Seamless Tubing

Cold drawn; f.o.b. mill

Random lengths over 5 ft. 55%
Selected lengths, 1 to 18 ft. 53%

Cast Iron Water Pipe

Class B Pipe—Per Net Ton

Six-inch and over, Bir. ....$35.00 to 36.00
Four-inch, Birmingham .... 39.00 to 40.00
Four-inch, Chicago ..... 46.00 to 48.00
Six to 24-inch, Chicago..... 42.00 to 44.00
Six-inch and over, N. Y..... 37.50 to 39.50
Four-inch, New York..... 40.50 to 41.50
Stand. fittings, Bir. base.... $100.00

Six to 24-inch, base; over 24-inch plus $20; 4-inch, plus $10; 3-inch, plus $20; gas pipe fittings, $5 higher. Class A pipe $4 higher than Class B.

Warehouse Quotations at Leading Centers, in Cents Per Pound

STEEL BARS

Baltimore	3.00c
Boston	3.265c
Buffalo	3.15c
Chattanooga	3.10c
Chicago	2.90c
Cincinnati	3.15c
Cleveland	2.85c
Detroit	3.00c
Houston	3.00c
Los Ang.	3.40c
New York‡(d)	3.10c
Philadelphia	2.60c
Pittsburgh	2.75c
Portland	3.15c
San Frans.	2.40c
Seattle	3.00c
St. Louis	3.15c
St. Paul	3.00c
Tulsa	3.65c

IRON BARS

Baltimore	3.25c
Boston	3.265c
Buffalo	3.15c
Chattanooga	3.10c
Chicago	3.00c
Cincinnati	3.15c
Detroit	3.00c
New York‡(d)	3.10c
Philadelphia	2.60c
St. Louis	3.15c
Tulsa	3.65c

REINFORC. BARS

Baltimore	2.50c-3.31c
Boston	3.265c
Buffalo	2.95c
Chattanooga	3.10c
Cincinnati	3.15c
Cleveland	2.25c-2.44c
Detroit	3.00c
Houston	3.00c
Los Ang. cl.	2.40c
Los Ang. lcl.	2.70c
New York	2.65c-3.10c
Phila.	2.40c-3.00c
Pittsburgh	2.75c
San Fran. cl.	2.30c
San Fran. lcl.	2.50c
Seattle	3.00c
St. Louis	3.15c
Tulsa	3.65c
Young.	2.30c-2.60c

SHAPES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland	2.95c
Detroit	3.10c
Houston	3.25c
Los Ang.	3.40c
New York(d)	3.10c
Philadelphia	2.50c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	3.75c

PLATES

Baltimore	3.00c
Boston	3.365c
Buffalo	3.25c
Chattanooga	3.20c
Chicago	3.00c
Cincinnati	3.25c
Cleveland, ¼-in. and thicker	2.95c
Clev., 3/16-in.	3.20c
Detroit	3.10c
Det., 3/16-in.	3.10c
Houston	3.00c
Los Angeles	3.40c
New York(d)	3.30c
Philadelphia	2.50c
Phila. floor	5.10c
Pittsburgh	2.85c
Portland	3.15c
San Fran.	2.40c
Seattle	3.00c
St. Louis	3.25c
St. Paul	3.10c
Tulsa	2.75c

NO. 10 BLUE

Baltimore	3.25c
Boston	3.915c
Buffalo	3.50c
Chattanooga	3.60c
Chicago	3.35c
Cincinnati	3.45c
Cleveland	3.10c
Detroit	3.35c
Houston	3.90c
Los Ang.	3.95c
N. Y. (d)	3.00c-3.40c
Portland	4.00c
Phila.*†	3.05c
Pitts.**	3.10c
San Fran.	3.65c
Seattle	3.75c
St. Louis	3.45c
St. Paul	3.40c
Tulsa	3.95c

NO. 24 BLACK

Balt.*†	3.50c
Boston	4.70c
Buffalo	4.20c
Chicago	3.80c
Cincinnati	3.90c
Clev.***	3.75c
Detroit	3.75c
Los Ang.	4.70c
New York	3.50c-3.65c
Phila.*†	3.50c
Pitts.**	3.35c to 3.40c
Portland	4.50c
San Fran.	4.15c
Seattle	4.25c
St. Louis	3.95c
St. Paul	3.545c
Tulsa	4.10c

NO. 24 GAL. SHEETS

Balt.*†	4.00c
Boston	5.45c
Buffalo	4.40c-4.60c
Chicago (local del.)	4.35c
Chicago (outside)	4.35c-4.60c
Cincinnati	4.40c
Cleveland	4.00c
Detroit	4.25c
Houston	5.40c
Los Ang.	5.10c
New York	4.00c-4.10c
Phila.*†	3.95c
Pitts.**	3.90c to 4.00c
Portland	5.00c
San Fran.	4.65c
Seattle	4.75c
St. Louis	4.40c
St. Paul	4.23c
Tulsa	4.60c-4.75c

BANDS

Baltimore	3.50c
Boston	4.015c-5.00c
Buffalo	3.50c
Chattanooga	3.30c
Chicago	3.10c
Cincinnati	3.35c
Cleveland	3.10c
Det. 3/16-in. & lighter	3.30c
Houston	3.65c
Los Ang.	4.30c
New York(d)	3.40c
Philadelphia	2.90c
Pittsburgh	3.10c
Portland	3.50c
San Fran.	3.75c
Seattle	3.50c
St. Paul	3.75c
Tulsa	3.85c

HOOPS

Baltimore	3.50c
Boston	5.50c-6.00c
Buffalo	3.90c
Chicago	3.65c
Cincinnati	3.90c
Cleveland	3.65c
Det. No. 14 & lighter	3.80c
New York	3.75c
Philadelphia	3.15c
Pittsburgh	4.10c
Seattle	4.90c
St. Paul	3.75c

COLD FIN. STEEL

Rounds & Hexagons

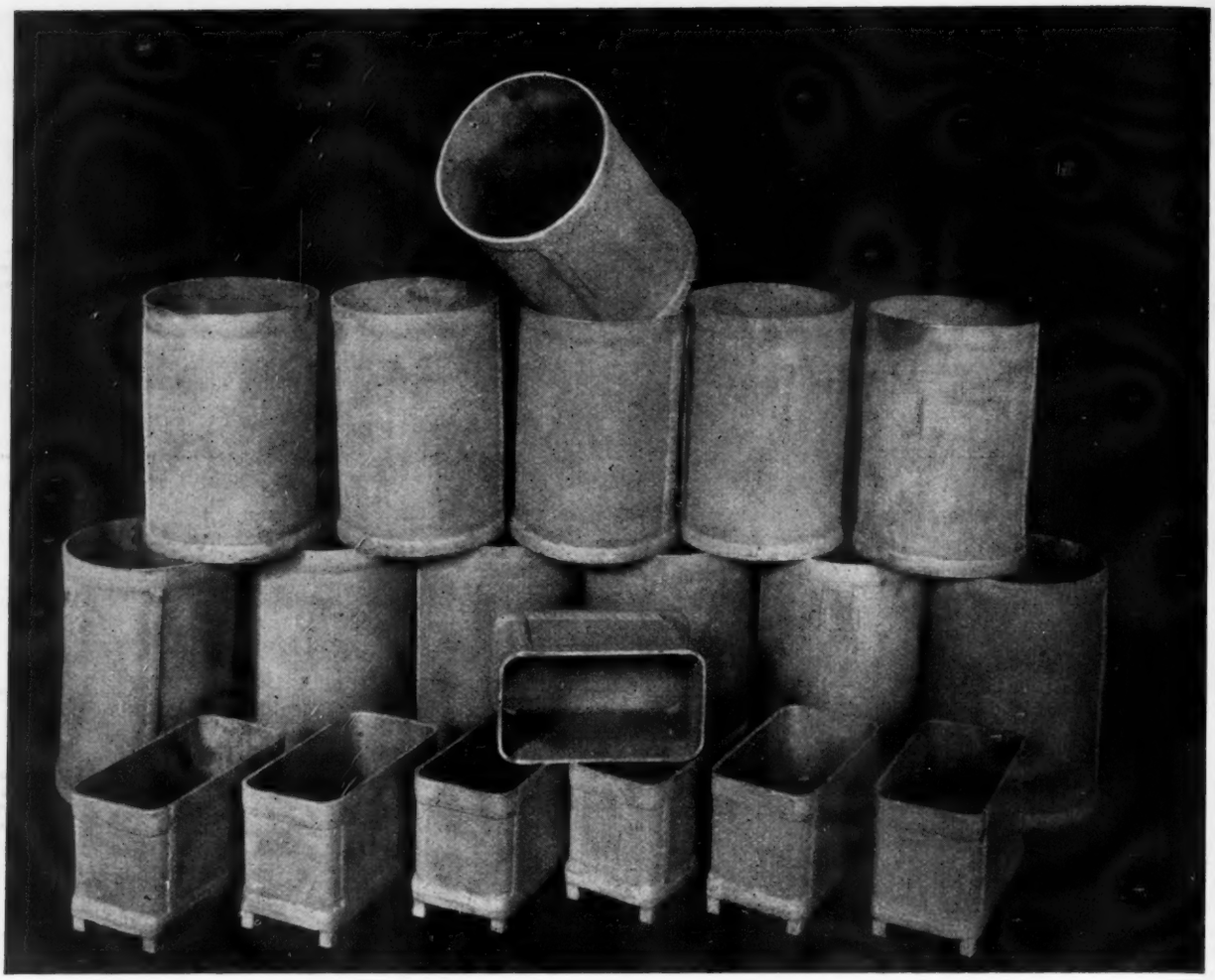
Baltimore (c)	3.30c
Boston	3.50c
Buffalo	3.15c
Chattanooga*	3.85c
Chicago	3.35c
Cincinnati	3.80c
Cleveland	3.40c
Detroit	3.65c
Los Ang. (a)	4.50c
New York	3.40c
Philadelphia*	3.40c
Pittsburgh	3.35c
Portland (a)	4.50c
San Fran.(a)	4.25c
Seattle (a)	4.50c
St. Paul (a)	3.85c
St. Louis	3.60c
Tulsa	4.75c

Flats and squares 5c extra, except Tulsa, where 5.14c is quoted. (a) Rounds, hex. only.

COLD ROLL. STRIP

Boston 0.100 in., 500 lb. lots	5.30c
Buffalo	5.65c
Chicago (soft) (b)	6.15c
Cincinnati	6.10c
Clev. (b)	5.95c
Detroit	5.40c
Phila. (c)	4.85c
New York	5.05c

(b)Net base straightening, cutting, boxing 1 ton or more.
(c) Plus mill, size and quantity extras.
(d)Minus quant. diff.
‡Domestic bars.
*Plus quantity extras.
**Less than 25 sheets.
*†50 or more bundles.



Toy Autos ... or ... Real Autos

both benefit from economies of "Nichrome"

Here is an odd photo taken on Driver-Harris shipping room floor. The small boxes are for a toy manufacturer—the large ones for an automobile plant.

No product is too small to benefit from "Nichrome" economies.

Hundreds of plants are benefiting from the economy results obtained by the use of "Nichrome" at high temperatures—economy in point of furnace hour service—shorter heats—reduced rejects.

Why not investigate the use of "Nichrome" in *your* plant.

All nickel-chromium carburizing containers are made under Henderson patent No. 1,270,519, owned by

DRIVER-HARRIS COMPANY
HARRISON, N.J.

Chicago · Detroit · Cleveland · Morristown, N.J. · England · France · Italy

TRADE MARK REG. U. S. PAT. OFF.

Nichrome

—the original heat-resisting alloy—

Mill Products

Base price cents per pound f.o.b. mill, except otherwise specified. Copper and brass product prices based on 9.50c, Conn., for copper

Sheets	
Yellow brass (high)	16.75
Copper, hot rolled	19.37½
Lead, full sheets (cut ½c more)	8.00
Zinc sheet (100-lb. base)	8.75
Tubes and Pipes	
Seamless yellow brass (high)	21.62½
Seamless copper	21.87½
Rods	
Yellow brass (high, full turnings)	15.00
Naval brass	16.00
Anodes	
Copper, untrimmed	16.87½
Wire	
Yellow brass (high)	17.25

Old Metals

Dealers' buying prices, cents lb.

Heavy Red Brass	
New York	6.00 to 6.25
Chicago	5.50 to 6.00
Cleveland	6.00 to 6.25
St. Louis	6.25 to 6.50
Heavy Yellow Brass	
New York	4.00 to 4.25
Heavy Copper and Wire	
New York	6.75 to 7.00
Boston	6.75 to 7.00
Chicago	6.75 to 7.25
Cleveland	6.00 to 6.25
St. Louis	6.50 to 7.00
Red Brass Borings	
New York	5.75 to 6.00
Yellow Brass Tubing	
Cleveland	3.50 to 4.00
Light Copper	
New York	6.00 to 6.25
Chicago	5.50 to 6.00
Cleveland	5.25 to 5.50
St. Louis	6.50
Light Brass	
Boston	3.00 to 3.25
Chicago	3.00 to 3.25
Cleveland	2.50 to 3.00
St. Louis	3.50 to 3.75
Zinc	
New York	1.25
Cleveland	1.00 to 1.25
St. Louis	2.00
Aluminum	
Clippings, soft, Cleveland	12.00 to 12.50
Clippings, hard Cleveland	9.50 to 9.75
Borings, Cleveland	4.50 to 4.75
Mixed cast, Cleveland	5.00 to 5.25
Mixed cast, Boston	4.00 to 4.50
Mixed cast, St. Louis	4.50

Secondary Metals

Remelt aluminum No. 12	10.50
Brass ingots, 85-5-5-5	9.00

Metals

Sales Continue Restricted as Prices Fall to Low Levels—Copper Market Is Mixed

New York—Four leading nonferrous metals have gone to new low prices here and in London. Interaction between the dull business situation and the break in the stock market was the cause of continued melting away of metal values during the past week.

Rapidly falling prices in turn drove buyers out of the market until they could see some sign that prices were reaching bottom. Where buying has been induced as a result of lower prices, the cases appear exceptional. Users of tin have been less inclined to buy on new low prices than previously.

Copper—All factors had no sooner settled to the basis of 9.50c, Connecticut, a week ago, than price cutting reappeared. The result was more swift reduction in prices than heretofore, and business was almost suspended in the various materials associated with copper due to demoralized conditions. While producers remain at 9.50c or out of the market, some custom smelters have cut to 9.00c and prompt resale metal has dropped as low as 8.75c, Connecticut. This is the lowest in the history of the copper mining in the United States. Gossip indicates that certain factors are pressed for cash and willing to take what buyers will pay.

Zinc—Buyers generally have shown indifference to extremely low prices. Although the ore market has fallen to $20 a ton or less, with much talk about aditional output curtailment, reports from Joplin do not show curtailment as great as expected.

Tin—Large business was done in tin when it fell to 23.12½c, and subsequently recovered, but in the past day or two it has dipped a little under 23.00c with only restricted buying. April statistics showed little change in the metal exchange's world visible supply, but actually world supplies increased about 2000 tons. Big shipments from the Straits are expected this month. The position of tin is weak for the time being, however.

Lead—Since prices fell to a new low of 4.00c, New York, buying has been more active and the market steadier.

Aluminum—New business is quiet but prices unchanged.

Coke By-Products Steady; Toluol Sales Slower

New York—Toluol sales have slumped slightly following a spurt last month. Prices are unchanged with the bulk of shipments now going at 27.00c a gallon in tanks. Benzol demand is unchanged with the lower figure of the price range prevailing for the largest volume. Xylol and solvent naphtha meet with routine demand at unchanged prices. Current production just about meets present demands. Spot business in naphthalene is fairly satisfactory, the disinfectant trade taking seasonal requirements. Phenol demand and prices are unchanged, buying being steady but not heavy.

Coke By-Products

Per Gallon, Producers' Plants, Tank Lots

	Spot
Pure benzol	$0.19 to 0.20
90 per cent benzol	0.19 to 0.20
Toluol	0.27 to 0.29
Solvent naphtha	0.25
Commercial xylol	0.25
Per Pound at Producers' Plants in 250-Pound Drums	
Phenol	0.16 to 0.17
Per Pound at Producers' Plants	
Naphthalene flakes	3.75 to 4.75
Naphthalene balls	4.75 to 5.75
Per 100 Pounds Atlantic Seaboard	
Sulphate of ammonia	$1.80 to $1.90

Quicksilver $100-102

New York—Quicksilver is quiet but steady at $100 to $102 a flask.

Prices of the Week, Cents a Pound

	Copper—Electro delivered	Copper—Lake delivered	Copper—Casting refinery	Straits Tin New York Spot	Straits Tin New York Futures	Lead N. Y.	Lead St. L.	Zinc St. L.	Aluminum 98-99%	Spot Antimony	Ingot Nickel
April 29	9.45	9.62½	9.17½	23.72½	24.00	4.00	3.80	3.37½	22.90	6.80	35.00
April 30	9.47½	9.62½	9.12½	23.25	23.55	4.00	3.80	3.35	22.90	6.80	35.00
May 1	9.37½	9.62½	9.12½	23.40	23.70	4.00	3.80	3.35	22.90	6.75	35.00
May 2	9.25	9.62½	9.12½	23.25	23.55	4.00	3.80	3.35	22.90	6.75	35.00
May 4	9.00	9.62½	9.00	22.87½	23.25	4.00	3.80	3.30	22.90	6.75	35.00
May 5	9.00	9.62½	9.00	23.37½	23.75	4.00	3.80	3.25	22.90	6.75	35.00

Europe

German Exports Slacken—Belgian Markets Weaker—French Book Pipe for China

London—(*By Radio*)—Conditions in the European steel markets are a shade worse than a week ago. In Germany the spurt in export business is dying out. In Belgium demand has lapsed and prices again are weakening. Trade with South America, which showed some improvement recently, is lifeless. Little change is noted in France. A French company has booked 8000 tons of pipe for China.

The depression continues in Great Britain, despite the fact steel exports from Middlesbrough gained slightly in April. One steelworks in Flintshire has closed for an indefinite period, throwing 2000 out of work. The Mannesmann Tube Works in South Wales is preparing to resume operations shortly.

Steel consumers in the Midland are refusing low offers from the Continent, owing to heavy stocks. Continental and Indian pig iron, however, is making inroads in Scotland.

British sheet mills are making some sales in the Far East. A few inquiries for galvanized sheets are coming from South America. The market for tin plate is stagnant.

British Steel Sees Little Second Quarter Recovery

Birmingham, Eng.—The dullness which has characterized markets shows no relief. In Birmingham reports from all sections of the trade reveal that the quarterly meeting has brought no inspiration or hope of expansion this quarter.

Forward contracting for pig iron is conspicuously absent. Midland foundries are buying small tonnages for early delivery but works are operating only half time and the aggregate tonnage does not show any increase over previous weeks. Furnaces in Northamptonshire, with one or two exceptions, are overstocked but in Derbyshire cast iron pipe foundries are absorbing practically all the make. Small quantities of foreign iron are being imported to the Midlands but the tonnages are insignificant. The position of prices will be reviewed by the producers association at the end of the month. But consumers are not expecting any relief in view of the fact that a lower selling price would probably mean a loss to the producer on every ton of iron smelted.

Marked Bars Are Lower

The scarcity of business in the Staffordshire iron trade is gradually breaking the resistance of ironmasters to lower prices. The price of best iron, known in the trade as marked bars, has stood for a long period at £12 10s ($60.75) at makers' works. This has been dropped to £12 ($58.32) to bring it into line with other qualities, such as strip, crown bars and common bars, which are not subject to control as in the case of marked bars. Though business has been poor generally in the iron trade for years past, marked bar producers have had a larger share of orders than any other department, and it would appear that they hope to attract some business by the reduction.

In Middlesbrough pig iron trade most of the current business is concerned with the local area. There is little hope of business with Scotland owing to price cutting by competing makes. Shipments for the month are about 2000 tons better than for the same period in March, but export trade is still flat. An encouraging omen is the announcement that Gjer Mills are to restart two furnaces in May which have been idle for ten months. These will probably be on hematite. East Coast hematite prices are steady, although merchants are cutting freely to secure export business.

Low Production Rate Costly

Most steelworks are operating far below capacity and this applies to all districts where heavy material such as plates, joists, etc., are produced. It is essential to change rolls frequently to deal with the variety of sizes specified and this expense and loss of time is of grave concern to producers. Some plants which have been modernized in the last few years have never yet had a chance of showing their capabilities and producers are beginning to wonder if they will ever see a demand sufficiently large to justify full operations with the rolling mills.

Birmingham merchants are quoting firmer prices for Continental steel, es-

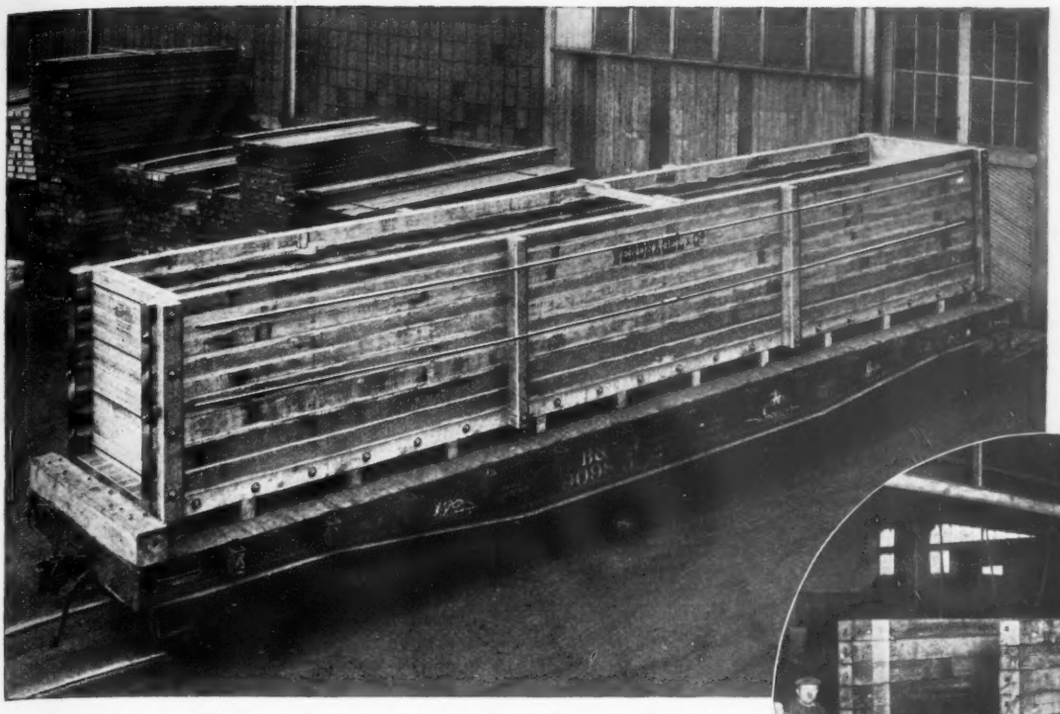
Current Iron and Steel Prices of Europe

Dollars at Rates of Exchange, May 4	*British* Gross Tons U. K. Ports		*French* Metric Tons Channel Ports		*Belgium and Luxemburg* Metric Tons Channel Ports		*German* Metric Tons Rotterdam or North Sea Port	
Export Prices f.o.b. Ship at Port of Dispatch—By Cable								
PIG IRON		£ s d		£ s d		£ s d		£ s d
Foundry No. 3**.....	$14.22	2 18 6*	$12.15	2 10 0	$12.15	2 10 0	$12.15	2 10 0
Basic-bessemer.....	14.58	3 0 0†	11.54	2 7 6	11.54	2 7 6	13.37	2 15 0
Hematite, Phos. .02-.05	16.16	3 6 6	.....	.....	.....	.....	17.01	3 10 0
SEMIFINISHED STEEL								
Billets.....	$26.12	5 7 6	$16.28	3 7 0	$16.28	3 7 0	$16.04	3 6 0
Wire rods.....	41.31	8 10 0	24.30	5 0 0	24.30	5 0 0	24.30	5 0 0
FINISHED STEEL								
Standard rails.....	$40.10	8 5 0	$31.59	6 10 0	$31.59	6 10 0	$31.59	6 10 0
Merchant bars.....	1.68c	7 15 0	.83c	3 15 0	.83c	3 15 0	.86c	3 18 0
Structural shapes.....	1.68c	7 15 0	.75c	3 8 6	.75c	3 8 6	.78c	3 11 0
Plates.....	1.79c	8 5 0	.95c	4 6 0	.95c	4 6 0	1.00c	4 11 0
Sheets, black, 24 gage	1.90c	8 15 0	1.80c	8 4 0	1.80c	8 4 0	1.84c	8 7 6
Sheets, gal., 24 ga. corr.	2.71c	12 10 0	2.28c	10 7 6	2.28c	10 7 6	2.31c	10 10 0
Bands and strips.....	2.06c	9 10 0	.96c	4 7 6	.96c	4 7 6	.96c	4 7 6
Plain wire, base.....	2.06c	9 10 0	1.08c	4 18 6	1.08c	4 18 6	1.10c	5 0 0
Galvanized wire, base..	2.39c	11 0 0	1.43c	6 10 0	1.43c	6 10 0	1.40c	6 7 6
Wire nails, base.....	2.39c	11 0 0	1.10c	5 0 0	1.10c	5 0 0	1.16c	5 5 0
Tin plate, box 108 lb...	$ 3.77	0 15 6	.....	.....	.....	.....	$ 8.26	1 14 0

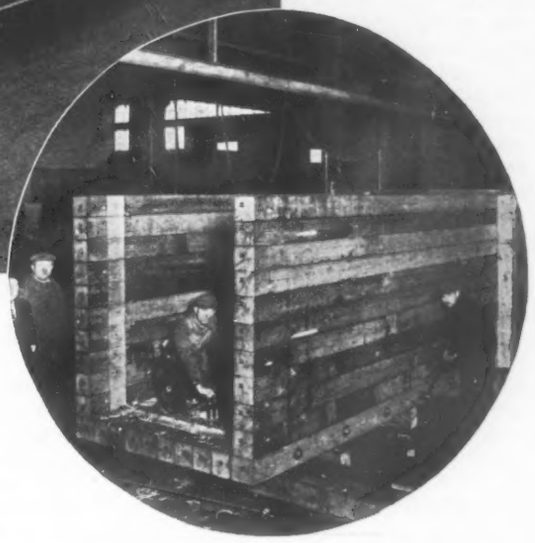
Domestic Prices at Works or Furnace—Last Reported

			French Francs		Belgian Francs		Renten Marks	
Fdy. No. 3 Pig Iron**	$14.22	2 18 6	$11.93	305(2)	$13.07	470	$18.58	78
Basic pig iron.....	14.58	3 0 0	12.71	325(1)	11.95	425	20.37	85.50
Furnace Coke.....	2.92	0 12 0	5.67	145	5.00	180	5.10	21.40
Billets.....	26.12	5 7 6	19.16	490	17.24	620	26.32	110.50
Standard rails.....	1.79c	8 5 0	1.41c	785	1.57c	1,210	1.37c	127
Merchant bars.....	1.68c	7 15 0	.92c	510	.88c	680	1.38c	128
Shapes.....	1.90c	8 15 0	.99c	550	.87c	670	1.35c	125
Plates.....	1.95c	9 0 0‡	1.26c	700	1.02c	785	1.58c	147
Sheets, black, 24 gage	1.90c	8 15 0	2.21c	1,225	1.89c	1,450	1.26c	117
Sheets, gal. 24 ga., corr.	2.39c	11 0 0	2.66c	1,475	2.54c	1,950	3.56c	330
Plain wire.....	2.06c	9 10 0	1.98c	1,100	2.08c	1,600	2.24c	207
Bands and strips.....	2.06c	9 10 0	1.22c	680	1.39c	1,075	1.60c	148

*Middlesbrough; †Basic; ‡delivered; (1) Basic-bessemer; (2) Longwy. British export furnace coke £0 12s 0d ($2.92) f. o. b. Ferromanganese £16 9s 0d ($79.95) delivered Atlantic seaboard, duty-paid. German ferromanganese £9 0s 0d ($43.74) f. o. b.; **Silicon 2.50-3.00. British quotations are for basic openhearth steel. French, Belgian, Luxemburg, and German are for basic-bessemer steel.



In circle: Tightening Monel Metal tie rods on wooden acid tanks during fabrication at WENDNAGEL & CO., Chicago.



One of two large acid pickling tanks constructed of 8" x 8" 100% heartwood long leaf yellow pine timbers fastened with rolled Monel Metal tie rods and forged Monel Metal nuts, washers and turnbuckles. These 42½' x 7½' x 7½' tanks were built this year for a prominent Chicago steel mill by WENDNAGEL & CO., Chicago.

Tough, corrosion-resisting

MONEL METAL tie rods keep pickling tanks TIGHT!

No. 51
Pickling Equipment that passes the test of service

HAVE you discovered *this* way that Monel Metal helps cut costs and retard depreciation in pickling departments? Equip your wooden pickling tanks with steel-strong, corrosion-resisting Monel Metal tie rods...and stop acid leaks before they start!

Many acid tanks come to an untimely end because their joints cannot be completely tightened at the start. Pickling liquor seeps through and rots the wood...and no amount of tightening can then remedy the trouble. But Monel Metal tie rods keep joints snug and leak-free right from the beginning.

You can "take up" on these tough rods to the necessary tightness without danger of stripping the threads or stretching the rods.

Due to its high Nickel content and uniform rolled structure, Monel Metal has remarkable tensile strength and is extremely resistant to the corrosive action of pickling solutions. Consequently, it is not subject to corrosion-cracking or fatigue failure. Many processors assert that Monel Metal tie rods have doubled the life of their wooden tanks. Under severe conditions of rotted wood, used Monel Metal rods may often be salvaged for construction of the new replacement tank.

These advantages are largely due to the fact that Monel Metal is nearly 70 per cent Nickel. When you purchase new equipment, remember that "Nickel Alloys Perform Better Longer", and that Monel Metal is a high Nickel alloy.

THE INTERNATIONAL NICKEL COMPANY, INC., 67 WALL STREET, NEW YORK, N. Y.

A HIGH NICKEL ALLOY

MONEL METAL

NICKEL ALLOYS PERFORM BETTER LONGER

Monel Metal is a registered trade mark applied to a technically controlled nickel-copper alloy of high nickel content. Monel Metal is mined, smelted, refined, rolled and marketed solely by International Nickel.

pecially for semifinished material, but demand is so quiet that it is difficult to ascertain what sellers would accept rather than miss the business. While 2-inch billets have been quoted as high as £4 11s ($22.11) delivered, there are merchants who would take less if they had the opportunity of snatching an attractive contract. Last week 3170 tons of foreign sheet bars and billets were unloaded in the Tees.

The quarterly ascertainment under the sliding scale agreement governing wages in the Welsh tin plate trade shows that the average net selling price per basis box of tin plate has fallen slightly and as a result there will be a small reduction in wages for the period ending August 1 next. Quiet conditions continue in the industry and prices are steady at 15s ($3.64) to 15s 6d ($3.76). Inquiries for export business are moderate, but Welsh makers are alarmed at the fact that Germany has been able to sell plates in the Japanese market, which formerly was a valuable trade to Welsh plates.

In the galvanized sheet trade all the mills are operating below capacity and the stagnation is unrelieved in the export markets. It has been possible, however, to restart the mills at the Upper Forest and Worcester works, Swansea.

At the half-yearly meeting of the Llanelly harbor trust imports were reported to show a decrease of 6674 tons and exports a decrease of 26303 tons.

German Steel Industry Feels Upward Urge

Berlin—Sentiment in the German iron and steel market has registered an improvemnt during recent weeks, partly because the steelworks association has decided not to accept further foreign orders for rolled products at present unsatisfactory prices. The Germans thus are following the example set by the Ougree, Angleur, and Cockerill concerns in Belgium, and are hoping that expectations of larger orders from Russia will materialize. Prices for finished products have advanced by 3s to 4s (73c to 74c), but it remains to be seen whether the lowest level really has been passed.

Foreign consumers have shown more interest, but the rate of operation is far from satisfactory. Merchant bars have advanced to £3 18s ($18.98), at which level the Scandinavian states have been buying. Structural shapes also have slightly revived, but business in this material continues handicapped by the slackness of building activity; nevertheless, the quotation has advanced to £3 11s ($17.28). Holland has remained a fair buyer of all kinds of rolled products. The Russians have placed orders for 25,000 tons of structural shapes, which will keep mills occupied two to three weeks. The Russians also have bought rails to the value of 1,000,000 marks, ($240,000) and intend to place large orders for pipes. It is hoped the materialization of large Russian orders announced during recent weeks will result in a better occupation of the industry as a whole. The city of Riga is negotiating with Krupp's and others for construction of a large bridge, worth about 12,000,000 marks ($2,850,000).

German Export Conditions Vary

China has shown slightly better interest, notwithstanding increasing Japanese competition. South America, on the other hand, is a limited buyer, as a result of the unfavorable economic conditions in those countries. The Scandinavian states have taken some tonnages of rolled products. American competition in the Far East is handicapping sales to a growing extent. Exports of wire products have improved. Notwithstanding the increase of the American import duty on galvanized wire-work to 50 per cent, these products still are exported to the United States, owing to the good quality of the German product. Sales to Japan are almost discontinued, due to the enlarged capacity of Japanese plants.

Domestic business has remained unsatisfactory, and the outlook has not improved. Total shipments of the steelworks association declined from 321,623 metric tons in January to 316,278 tons in February. Sales of material for permanent way suffer as a result of reduced needs of railroads, while demand for other materials is slack owing to unsatisfactory building activity.

The pig iron market is slack, and active furnaces have been reduced to about 50. It is hoped the anticipated Russian orders may result in the placing of better orders with machine makers.

French Trade Picks Up

Paris—Exports of iron and steel, pig iron and ferroalloys from France in February showed an increase over January figures.

Imports of steel products into France in February decreased slightly from January. Comparisons follow, in metric tons:

	IMPORTS		EXPORTS	
Mon. ave.	Pig iron and ferro-alloys	Steel*	Pig iron and ferro-alloys	Steel†
1928	5,000	9,500	54,000	343,000
1929	4,000	14,000	48,000	281,000
1930	14,000	21,000	45,000	273,000
1931				
Jan.	11,000	23,000	42,000	246,000
Feb.	14,000	22,000	44,000	265,000

The above figures include returns from the Saar district.

*Semifinished steel, plates and sheets, tin plate, steel tubes, steel scrap.

†Ingots, semifinished steel, merchant bars, structural steel, steel tubes, wheels and tires, rails, hoops and bands, wire rod and wire products, plates and sheets, tin plate, steel scrap.

French Output at New Low

Paris—A considerable drop was registered in iron and steel production of France for February. The output of pig iron in February was the lowest monthly tonnage since February, 1927.

The output of steel ingots and castings in February was the lowest recorded since November, 1927. Comparative figures follow:

Mon. ave.	Iron ore	Pig iron	Steel ingots and castings
1913	3,588,000*	756,000*	581,000*
1928	4,094,000	832,000	792,000
1929	4,220,000	864,000	808,000
1930	4,038,000	841,000	783,000
1931			
Jan.	3,805,000	801,000	746,000
Feb.	3,397,000	726,000	693,000

*In present boundaries.

British Trade Is Heavier

London—Exports of iron and steel from Great Britain in March showed a slight improvement over the January and February figures, particularly as regards steel products.

Imports of pig iron, ferroalloys and other iron and steel products into Great Britain in March increased over February, most being from Belgium. Comparative figures follow, in gross tons:

	IMPORTS		EXPORTS	
Mon. ave.	Pig iron and ferro-alloys	Other iron and steel	Pig iron and ferro-alloys	Other iron and steel
1928	9,935	231,390	37,895	317,210
1929	12,310	222,410	45,430	319,520
1930	26,010	216,355	26,445	236,715
1931				
Jan.	23,345	198,428	18,743	148,630
Feb.	20,836	156,220	13,840	129,685
March	22,777	187,690	15,836	154,453

Luxemburg Output Declines

Brussels—Output of pig iron in Luxemburg in February dropped from that of January, bringing the output for the first two months to 351,978 tons, against 481,201 tons for the corresponding period of 1930, a decrease of 27 per cent.

The output of steel ingots and castings in February was less than in January. For the first two months output of raw steel showed a decrease of 22.8 per cent from 1930. Comparisons follow, in metric tons:

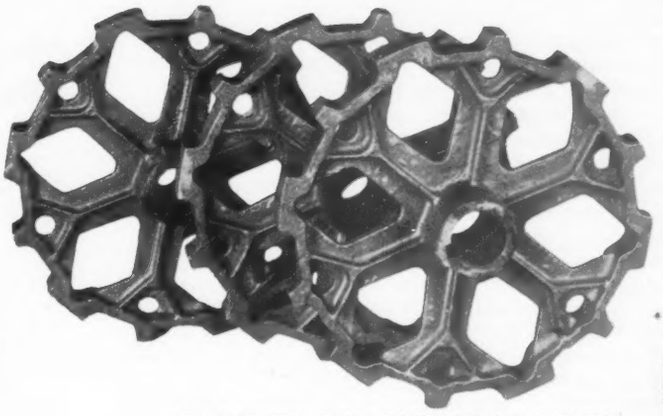
Mon. ave.	Furnaces on last day	Pig iron	Steel ingots and castings
1913	....	212,000	111,000
1928	38	231,000	214,000
1929	37	242,000	226,000
1930	26	206,000	189,000
1931			
Jan.	25	183,130	171,591
Feb.	25	168,848	161,140

FARRELL'S EIGHTY FIVE -85

TOUGH-RIGID-STRONG-WEAR RESISTING CAST STEEL

TRADE MARK

TOOTH FOR ORE DRAG BUCKET



SPROCKETS FOR SAND DRAG CHAIN

UNIVERSAL MILL SLEEVE GEAR

ICE GROUSERS FOR TRACTORS

PIVOT BEARING FOR BULLDOZER

Universal application of this steel is speedily becoming a realization. Flexibility by means of various grades for fitting each part to its own peculiar performance conditions is responsible in a measure for the introduction of Farrell's 85 into the major cement mills, blast furnaces, steel mills, mines, sand and gravel pits, other industrial plants, and to the manufacturers of road building, mining and other equipment, aircraft, machine building and maintenance.

It is recommended for all parts needing strength, toughness, rigidity and resistance to wear and abrasion. The remarkable increase in tonnage sold is ample proof of its living up to that recommendation.

Ask for a cover binder with bulletins containing physical properties, and allow us to give you further details.

FARRELL-CHEEK STEEL FOUNDRY COMPANY, Sandusky, Ohio

New York Office
136 Liberty Street
Phone Hitchcock 6137

Philadelphia Office
401 N. Broad Street
Phone Walnut 56-32

Birmingham Office
2124 Highland Ave.
Phone 4-2393

Duluth Office
518 Providence Bldg.
Phone Melrose 1095-J

St. Louis Office
907 Security Bldg.
Phone Garfield 5222

Denver Office
3417 E. 14 Ave.
Phone York 9181

FARRELL-CHEEK

Machinery

WITH the exception of Chicago, no industrial center reports anything which can be construed as materialization of the long looked for late spring recovery in the machine tool business. Elsewhere conditions are such as to strengthen the general belief that recovery will not be evident to any extent until fall. Among unfavorable factors the postponement of the opening of a large new industrial plant in New England stands out, involving as it does, possible cancellation of many equipment orders. Firmness with which the industry has resisted price pressure is unparalleled.

New York—Machine tool buying and inquiry are light. The equipment market again appears to have settled down to a period of watchful waiting, with recovery depending largely upon improvement in general business conditions. Most of the industries which should be the best prospects either are out of the market or are inquiring only for one or two special tools for future delivery. What sales there are, are limited to individual units. In other words, "midsummer dullness" seems to have gripped the market before its usual period.

April was below the March rate with most dealers and builders. Thus far, May has failed to show signs of any recovery. The general opinion now holds that the slack pace will continue through the summer with recovery due sometime in fall.

Worcester, Mass.—Postponement of the opening of the new plant of the Simonds Saw & Steel Co., Fitchburg, Mass., which was mentioned in this report last week, now proves to be a serious blow to the machine tool industry. Closely following the postponement announcement, this company sent out letters to machine tool builders requesting that its orders covering new mechanical equipment for this plant be cancelled.

Whether or not this cancellation request generally will be acceded to remains to be seen. A number of manufacturers had to purchase new tools in order to build special machinery for this plant, while others who accepted orders for standard machines, have them ready for delivery.

Pittsburgh—Activity in machine tools continues to be disappointing. April sales generally fail to show improvement as compared with March and recent quietness in inquiry indicates that there will be but little pickup in the near future. Orders are spotty and usually call for only single tools. Inquiry is comparable to this, with large lists lacking.

Chicago—More pressure is being exerted upon machine tool prices by prospective buyers than at any time in two years. In the belief that business actually promised as contingent upon substantial concessions in price would not necessarily materialize, machine tool builders have been holding their ground firmly. Only in a few recent railroad orders have bids reflected any indication of downward trend.

A few tools remain on the Santa Fe list, further purchases against this inquiry having been made during the week. Dealers with railroad bookings in April report that April has been a fairly satisfactory month. In fact, one or two houses rate April business as their best since last June, it being the only month in the last six to show profits on the basis of new orders. A road machinery builder in the Chicago district is expected to buy some equipment in the near future, and several small industrial lists are pending in the Milwaukee district.

Cleveland — No signs of improved activity are evident in the machine tool market here and most of the builders and dealers seem to be resigned to a quiet summer. In any event, hopes of late spring recovery have been wiped out completely. Inquiry continues at a fair rate, having been stimulated in many cases by the recent announcement of new designs. Volume of business in small tools and repair parts, while continuing far above the machine tool level, shows signs of lessening.

While recent reports indicate that employment conditions have improved, no great amount of this improvement can be credited to the metalworking industries, operations therein still being at a low ebb.

Hoist Figures Show Gain in March Business

New York—Members of the Electric Hoist Manufacturers' association report the number of hoists ordered during March increased 29.946 per cent over the rate for February, and the value of such orders showed an increase of 7.694 per cent over the February value. Shipments were 25.669 per cent greater in March than during the previous month.

March Totals Show Gain in Overhead Crane Orders

New York—An increase in electric overhead crane orders in March has just been announced by the Electric Overhead Crane institute. Orders comprised 46 cranes with capacity of 1354 tons and a valuation of $671,221. In February, 30 cranes were placed, having capacity of 679 tons and valuation of $267,961.

Unfilled orders on April 1 comprised 110 cranes, with aggregate capacity of 3603 tons and valuation of $1,551,685. This was a slight gain from the preceding month when 102 units were on order with total capacity of 3066½ tons and value of $1,297,334.

On the other hand, shipments declined in March, comprising as they did 34 units with capacity of 728½ tons and total valuation of $261,0.63. Shipments in February totaled 52 units, with capacity of 1182 tons, and valuation of $530,430,

Manning, Maxwell & Moore Changes Chicago Setup

New York—Manning, Maxwell & Moore Inc. announces its withdrawal from direct sales representation of Putnam machine tools and Shaw overhead electric traveling cranes in the Chicago territory. The Chicago sales branch of Manning, Maxwell & Moore Inc. was closed May 1 and Dean Machinery Co. has been appointed to represent this company in the sale of Putnam machine tools and Shaw cranes in that territory.

R. S. Dean, president of the Dean Machinery Co., is a recognized authority on machine tools and plant equipment. Mr. Dean has been connected with Manning, Maxwell & Moore Inc. for 22 years, and for several years he has been manager of its Chicago branch, specializing in the sales of Putnam machine tools and Shaw cranes. The Dean Machinery Co. has offices located at 80 East Jackson boulevard, Chicago, with warehouse at 2601 Cottage Grove avenue.

The Chicago office of the Consolidated Ashcroft-Hancock Co. Inc., which is a subsidiary of Manning, Maxwell & Moore Inc., will continue without change.

Construction and Enterprise

CONCISE, TIMELY BUSINESS BUILDING OPPORTUNITIES IN FIELD OF INDUSTRY

New England

ANSONIA, CONN.—American Brass Co., Grand and Meadow streets, Waterbury, Conn., has let contract for extensions and alterations to its local plant. Cost is estimated at $100,000.

PLANTSVILLE, CONN.—Plantsville Foundry Corp. is a new industry here, for the manufacture of gray iron castings. Company will employ 75. Frederick A. Oefinger is president, William C. Kline vice president and B. F. Harpel secretary.

BOSTON—Long Machinery Corp. has been incorporated with $25,000 capital by Edward A. Long, 55 Valley road. J. R. Walton and Donald M. Hill Jr., Cambridge, Mass., also are interested in the company.

PORTSMOUTH, N. H.—Bureau of supplies and accounts, navy department, Washington, will receive bids May 19 on schedule 5652 for one motor-driven low pressure compressor set, with spare parts.

New York

BROOKLYN—Onteora Mfg. Co. has been incorporated with $10,000 capital by G. F. Alexander, 32 Court street, to make vending and weighing machines.

BROOKLYN—C. H. Leibfried Mfg. Corp., 112 Dobbin street, will build a plant at Guernsey street and Norman avenue, 70 x 100 feet. Cost, including equipment, $40,000. J. A. Napoli, 151 Thirty-second avenue, Flushing, N. Y., is architect.

NEW YORK—Steel Casement Metal Weatherstrip Co. has been incorporated with $10,000 capital by F. L. Biusti, Bayside.

NEW YORK—Metal Carbides Co. has been incorporated with 1000 common shares by Stein, McGlyn & Hannoch, 17 Academy street, to deal in alloy metals for tools.

NEW YORK—Macneil Instrument Corp., whose incorporation recently was noted, has established temporary offices at 25 Broad street. Robert L. Macneil, Great Neck, L. I., N. Y., is president, Paul H. Macneil vice president and P. Chauncey Anderson secretary. Company will manufacture an all-weather sextant. (Noted April 30.)

WATERTOWN—Beebe Island Corp., G. Seymour president, care of Knowlton Bros. Paper Co., 213 Factory street, has plans for a 10,000-horsepower generating plant, to cost $600,000. Contract will be awarded soon.

New Jersey

HOBOKEN—United States Testing Co. Inc., 1415 Park avenue, will build a plant addition for operations and storage.

LAKEHURST—Bureau of supplies and accounts, navy department, Washington, will receive bids May 12 on schedule 5666 for one pipe cutting machine.

Pennsylvania

PHILADELPHIA — Plant of the Keystone Spring Co., 1316 Nectarine street, recently was damaged by fire.

PHILADELPHIA—Zinman Sprinkler Corp. has been incorporated with $5000 capital by Frank Zinman, 2129 North Ninth street, to manufacture, erect and repair fire protection apparatus and sprinkler systems.

PHILADELPHIA—Keystone Metal Stamping Works Inc. has been incorporated with $25,000 capital by George A. Dether, 550 North Fifth street, and Daniel Gillis, 4414 Longshore street, Tacony, Philadelphia, to manufacture, lease and sell metal specialties.

PITTSBURGH—Kenney Co. Inc. has been incorporated with $10,000 capital by Raymond P. Kenney, 171 Kendall avenue, Bellevue, Pittsburgh, to manufacture and distribute steam, heating, ventilating and refrigerating systems.

Ohio

AKRON—Sun Oil Co., 1608 Walnut street, Philadelphia, will build a distributing plant here, to include tanks and pump house. Cost is estimated at approximately $200,000. J. D. Whitmore, box 920, Toledo, engineer of western district, has working plans.

BEDFORD—Lempco Products Inc., manufacturer of axles, gears, brake drums and other motor parts, will proceed immediately with erection of a plant addition, to cost approximately $250,000. James F. Strand is president.

CLEVELAND—City council has received a proposal to enlarge the city light plant and install new generators. Cost is estimated at $2,000,000. Ernest J. Bohn is chairman of the public utilities committee. L. A. Quayle is city utilities engineer.

CLEVELAND — Strong, Carlisle & Hammond Co., L. J. Hammond president, 1394 West Third street, proposes to build a 120 x 156-foot machine and storage building at 2801 St. Clair avenue. H. M. Morse & Co., 750 Prospect avenue, are engineers. Cost is estimated at $75,000.

SPRINGFIELD—Ohio Steel Foundry Co., James street, is completing a 3-story pattern storage addition, 60 x 150 feet.

TOLEDO—City, W. T. Jackson mayor, will investigate proposal to establish a municipal light and power plant. Councilmen A. C. Jones and A. C. Volmer are in charge.

Indiana

INDIANAPOLIS—Plant of the Hercules Mfg. Co., 2122 Northwestern avenue, recently was damaged by fire, with loss estimated at $15,000. Company manufactures automobile accessories.

JASPER—City will award contract soon for construction of a power plant and installation of equipment. C. Brossman, Chamber of Commerce building, Indianapolis, is engineer.

Michigan

DEARBORN—Graham Paige Motor Car Co. is reported to be investigating sites in the border cities of Canada for erection of a Canadian plant.

DETROIT—Michigan Rolling Mills & Products Corp., 1010 Ford building, has been incorporated with 50,000 no par shares by Eric Steil, 281 Calvin street, to manufacture and deal in steel, copper, brass and other metals.

DETROIT—Formed Screw Products Co., 13835 Jennings avenue, has been incorporated with $37,500 and 3250 no par shares by Howard A. Hayden, 12380 Wisconsin avenue, to manufacture and sell metal products.

DETROIT—James M. Stone Inc., 1210 Metropolitan building, has been incorporated with 1000 no par shares by Earl Steinbrick, 147 West Michigan avenue, to manufacture and deal in diamonds and cutting tools.

HARTFORD—City has taken bids for the construction of a municipal light and power plant, to cost $50,000. City engineer is in charge of plans.

Illinois

CHICAGO—Imperial Steel Products Corp., 1647 Fulton street, has been incorporated with $10,000 capital by A. Redman, 105 West Monroe street, to deal in iron, steel, copper and brass.

CHICAGO—Railway Express Agency, 58 East Washington street, will rebuild structures at Sebor and Jefferson streets for shops and offices. Cost is estimated at $400,000. Contract has been awarded.

CHICAGO—Dean Machinery Co., 7 South Dearborn street, has been incorporated with $50,000 capital by Samuels, Lawton & Wittelle, 7 South Dearborn street, to manufacture and deal in machinery.

CHICAGO—Commonwealth Edison Co., 72 West Adams street, will build the first section of its Humboldt park distributing station on a site 108 x 225

feet, on Western avenue. Unit will be seven stories, costing $800,000. Plans are by H. V. vonHolst, 79 West Monroe avenue.

Southern States

BIRMINGHAM, ALA.—Chamber of commerce is reported to be in contact with Ohio road machinery manufacturers who are investigating sites for erection of a plant here. An industry to employ 140 men is planned.

NEW CASTLE, DEL.—Intercontinental Pipe & Mining Co., care of H. Kennedy Co., 122 East Forty-second street, New York, will proceed with plans for alteration of plant units acquired here, and with plans for equipment. Plant is to manufacture steel and iron pipe. Cost is estimated at $1,000,000. (Noted Jan. 29.)

WILMINGTON, DEL. — Clayton Markand Co. has been incorporated with $1,000,000 and 200,000 common shares by Corporation Trust Co., to deal in iron, steel, manganese, copper, zinc and other metals.

WASHINGTON—Bureau of supplies and accounts, navy department, will receive bids June 2 on schedule 5650 for main propelling machinery for major alterations to naval vessels. Each of three sets of machinery will include four main turbines and condensers, motor-driven and turbine-driven pumps, spare parts and auxiliaries. Bids also will be taken on modification of present electric propelling machinery, which will require condensers, motors and parts.

ATLANTA, GA.—Lawrence Manning, 6 Fifteenth street northeast, is reported to be in the market for two 20-ton derricks, two electric hoists and two clamshell buckets.

AUGUSTA, GA. — Richmond Sandgravel Co., 1226 Sumter street, Columbia, S. C., has acquired a site of 11 acres here for the erection of a plant, work on which is to proceed immediately. John G. Ehrlich is president.

MACON, GA.—Aviation and finance committee of city council is in charge of new developments at municipal airport, Miller field. Watson Walker is city engineer.

LOUISVILLE, KY.—Heating & Power Specialty Co. has been incorporated by A. S. Lewis Jr., 2121 Treviln way, to make devices and apparatus.

CANTON, MISS.—City council plans to rebuild the municipal light and power plant, recently damaged by fire. Loss was estimated at $50,000.

RICHMOND, VA.—City council is considering a plan to enlarge the municipal power plant and install new equipment. Carleton E. Jewett, Mutual building, is interested in the proposal. Estimated cost, $2,000,000.

CHARLESTON, W. VA.—Appalachian Electric Power Co. has let contract to L. H. Keeney, South Ruffner street, for a garage, repair shop and warehouse. Warne, Tucker, Silling & Hutchinson, Masonic building, are architects.

Missouri

ELLINGTON — Van Buren Light, Power & Ice Co. is considering reconstruction of its power station, following a recent fire which damaged property and equipment to the extent of $35,000.

KANSAS CITY—Midland Mfg. Co. has been incorporated by J. J. Mahoney, 4337 Campbell street, to manufacture auto appliances.

ST. LOUIS—Sun Electric Mfg. Co., 2410 South Fourth street, whose organization recently was noted, will make health equipment and other devices, including lamps, electric bath cabinets and automotive coil testers. E. J. Rauch is president. (Noted April 23.)

ST. LOUIS—James R. Kearney Corp., 4224 Clayton avenue, advises through Myles D. Thurston that addition recently noted will provide 30,000 square feet additional plant space, machinery to be added. Contract is held by Humes-Deal Co., Arcade building. Aegerter & Bailey, Railway Exchange building, are architects. (Noted April 9.)

ST. LOUIS—Saint Louis Meter & Pump Co., C. C. Fredericks president, advises that the company will manufacture and distribute meters, pumps and equipment for handling gasoline, oils, and other liquids. Plant formerly occupied by Saint Louis Pump and Equipment Co. is being leased, but construction of a new plant to be ready for occupancy about Oct. 1 is being considered. No new equipment will be purchased until operations have been moved to the new site. Principal office is located at 3701 Forest Park boulevard. (Noted April 30.)

Arkansas

LITTLE ROCK—Big Rock Stone & Material Co., foot Ashley street, plans to construct a plant at Garland avenue and Spring street. John C. Eakin is sales manager.

MAMMOTH SPRINGS — Arkansas-Missouri Power Co., 72 West Adams street, Chicago, has plans under way for a power project on the Spring river near here, to include construction of two dams and two power plants. Plans are private. Cost is estimated at $320,000. C. V. Sebaugh, Blytheville, Ark., is local representative.

Oklahoma

OKLAHOMA CITY—J. I. Case Co., E. E. Russell vice president, Racine, Wis., advises that company has not arrived at a decision to proceed with the 1-story addition recently noted as planned for erection here. (Noted April 30.)

POTEAU — Daisy Diamond Coal Mining Co. has been incorporated by H. E. Kendrick, to engage in mining operations.

STILLWATER—Oklahoma Agricultural & Mechanical college proposes installation of a 350-kilowatt steam turbine generating unit. Cost is estimated at $30,000.

STILLWATER—Mid-West Tool Co. has been incorporated with $25,000 capital by G. W. Hannum, 420 Northwest Eleventh street, to operate a machine shop for repair of oil field tools.

Texas

ALBANY—Putnam Supply Co. has moved headquarters here and plans expansion of machine shop facilities. Company's headquarters formerly were located at Putnam, Tex.

AMARILLO—Harold English has let contract to Berry & Hatch, Oliver Eakle building, for construction of a machine shop building, 50 x 140 feet.

ARP—Brauer Machine & Supply Co., Oklahoma City, Okla., is establishing a branch machine shop here for repair of oil field tools. Earl Schrigley is local manager.

CLEBURNE—Bischof Airplane Mfg. Co. is being established in a plant here, moving from Ft. Worth, Tex. George F. Bischof is president.

FT. WORTH—Shamrock Natural Gas Co. plans construction of an 18-inch gas pipe line from Amarillo, Tex., to a location here, to include three pumping stations.

FT. WORTH—Texas Electric Service Co. has awarded contract to H. B. Friedman, 1407 Sinclair building, for construction of a substation on North Taylor street, to cost $4000.

GALVESTON—City has plans for power, turbine and boiler plant equipment for the municipal light plant. Burns & McDonnell Engineering Co., Interstate building, Kansas City, Mo., is engineer. Estimated cost, $1,000,000.

HOUSTON—Schmidt & Kennon, 634 North Edgewood street, have taken a permit to erect a machine shop.

HOUSTON — American Engineering Corp. has been incorporated with $25,000 capital by Linn K. Park, 1816 Nance street, to manufacture oil field and engineering specialties.

KILGORE—Sour Lake Machine & Supply Co. has been incorporated with $15,000 capital by S. D. Ewing and John R. Everitt.

MAVERICK—Ulen & Co., 120 Broadway, New York, will start construction of a hydroelectric project on the Rio Grande river near here. Cost is estimated at $1,200,000.

NEW BRAUNFELS—Sertex Materials Co. has been incorporated with $600,000 capital by I. A. Ogden, to manufacture building materials.

VEGA—City council has plans for installation of a waterworks system. Pumps will be required. Bonds for $25,000 have been voted.

Wisconsin

GREEN BAY — Wisconsin Public Service Corp., Bellin building, is starting work on an addition, 42 x 45 feet, to its boiler plant at Jefferson and Elm

IN THE BREATHING SPELL

This symbol of "Tested Quality" appears on every container. It is the identifying mark of a super-product.

During the period of curtailed production Neely research engineers have continued their work with even greater diligence than before.

Every step of the manufacture from raw material to finished product is carefully guarded by scientific and mechanical tests for precision, accuracy, strength, and fine finish. The result—"Tested Quality."

Watch for additional information on the subject—and in the meantime, avail yourself of the added service by specifying Neely "Tested Quality" on all orders for Bolts, Nuts, Rivets, Rods, and Upset Forgings in standards or made to specifications.

Neely

NUT & BOLT CO.

PITTSBURGH, PA.

SINCE 1856

PIONEER MANUFACTURERS OF

SILICA AND CLAY BRICK

SPECIALIZING IN

BLAST FURNACE LININGS, SLEEVES & NOZZLES

HAWS REFRACTORIES COMPANY

JOHNSTOWN, PA.

streets. O. J. Hannas is construction engineer.

MILWAUKEE — General Machine Co. has been incorporated with $10,000 capital by Edward L. Lowe, Erich F. Koch and Martin F. Hebein, of the firm of Lowe & Koch, machinists, Enterprise building.

Minnesota

ST. PAUL—Superior Metal Products Co. is building a 1-story plant, 60 x 110 feet, for the manufacture of milk cans and dairy equipment. Cost, with equipment, is estimated at $25,000.

Pacific Coast

MARSHFIELD, OREG.—Coos Bay Iron Works foundry recently was damaged by fire. Estimated loss, $5000.

PORTLAND, OREG. — S. Birkenwald Co., manufacturer of refrigerators and butchers' equipment, will call for bids soon for a plant, 100 x 100 feet, to be built at Twenty-second and Pettygrove streets.

SEATTLE—Precison Tool Co. Inc. has been organized with $15,000 capital by James C. Foley and James W. Sadler.

Dominion of Canada

BELLEVILLE, ONT. — American Hardware Corp. of Canada Ltd. has been incorporated with $200,000 capital by John C. A. Cameron, to manufacture and deal in hardware and machines.

LONDON, ONT.—Canada Culvert Co. Ltd. has been incorporated with 10,000 no par shares by Ashton R. Douglas, to carry on the business of ironmasters and founders.

PETERBORO, ONT.—Card & Paper Works Ltd., 164 Sherbrooke street, has let contract to C. H. Huffman, 311 Elias avenue, for the erection of a plant addition, 50 x 85 feet. Cost is estimated at $25,000.

SOUTH PORCUPINE, ONT.—Canusa Mining & Exploration Co. Ltd., Metropolitan building, Toronto, Ont., is considering erection of a 50 or 75-ton mill here. F. Miller is president.

STURGEON LAKE, ONT.—St. Anthony Gold Mines Ltd., Toronto General Trusts building, Bay street, Toronto, Ont., plans to build a 1000-horsepower hydroelectric power plant and a 125-ton cyanide mill here. Construction is to start immediately.

TORONTO, ONT.—H. M. Kipp & Co. Ltd., 447 Yonge street, is opening a plant on Carlaw street for expansion of radio manufacture, through an arrangement with an American company.

TORONTO, ONT.—City, R. C. Harris, city hall, engineer, is considering replacement of eight boilers in the waterworks pumping station on John street. Cost is estimated at $203,000.

TORONTO, ONT.—Central Patricia Gold Mines Ltd., Canada Permanent building, plans to build a mill with 50 tons capacity on its property in the Patricia district. F. J. Connell is president.

LONGUEUIL, QUE. — Canadian Vickers Ltd., 5136 Notre Dame street east, Montreal, Que., is considering removal of its plant and offices to a site on Lorne street, here.

PRINCE ALBERT, SASK.—Canadian Utilities Ltd. plans to spend approximately $200,000 for erection of a plant addition and for distribution extensions. W. J. Murphy is manager.

New Trade Publications

CONVEYORS—Alvey Mfg. Co., St. Louis, in a bulletin suggests uses for its conveyors to reduce cost of transportation in various industrial plants.

LIFT TRUCKS—A new lift truck is illustrated and described in Bulletin 93J, issued by the Revolvator Co., 336 Garfield avenue, Jersey City, N. J. Tables of specifications are given.

ELEVATOR DOOR CLOSER—A bulletin by the Warner Elevator Mfg. Co., Cincinnati, shows its elevator door closer and interlocking switch, with drawings of its construction and method of operation.

PYROMETER TUBES—A leaflet by Claud S. Gordon Co., 708 West Madison street, Chicago, illustrates its metal pyrometer tubes, which are inspected by x-ray before being put to use.

ALLOY STEEL CASTINGS—Corrosion resistance and technical data on its special analysis steels are presented in a booklet by the Duriron Co., Inc., Dayton, O. Tables indicate the degree of resistance shown by the several alloys when subjected to a large number of corrosive chemicals.

AIR COMPRESSORS—Tests of air compressors in a 500-hour non-stop run are presented in a bulletin by the Davey Compressor Co. Inc., Kent, O. Comparative results in the case of four compressors are presented in tables and illustrations. Points of the Davey compressors are stressed in relation to their value to the user.

REDUCTION CRUSHERS—Bulletin No. 110 by the Traylor Engineering & Mfg. Co., Allentown, Pa., outlines the development of reduction crushers and the aims sought by builders. Illustrations and description point out features developed in this type of crusher to overcome difficulties. A table of sizes and capacities is included.

JIG BORING MACHINE—A bulletin on its jig boring machine has been issued by the Keller Mechanical Engineering Corp., 70 Washington street, Brooklyn, N. Y. It is designed for rapid low-cost precision boring and layout. The vernier scale measuring device is illustrated and described and details of the machine are presented in a table of specifications.

ROLLER BEARINGS—A revised edition of the *Timken Engineering Journal* has been issued by the Timken Roller Bearing Co., Canton, O. It contains information on construction, methods of application, fitting practice and other information. It forms practically a manual on roller bearings, with data tables, drawings and full descriptions.

PERFORATED PIPE—Catalog No. 4 issued by the Armco Culvert Manufacturers association, Middletown, O., gives a complete description of its perforated pipe, reasons for its development, research preceding its development, varied applications and advantages and complete instructions for ordering and installing. A page is devoted to capacity and sizes and helpful formulas are given.

DIE SETS—Danly Machine Specialties Co. Inc., 2104 South Fifty-second avenue, Chicago, has issued the seventh edition of its loose-leaf catalog, showing its complete line of standardized, interchangeable die sets and diemakers' supplies. A table shows the largest die set and die space that can be used on all standard sizes and makes of presses and the maximum diameter of round dies that can be mounted on the regular standard sets for each size.

SPRAY NOZZLES—Bulletin No. 6A has been issued by the Schutte & Koerting Co., Philadelphia, on its spray nozzles for use with water, oil and other liquids to produce flat and conical sprays from fine atomization to coarse drops. Various types are illustrated, with charts of capacities for each type. Water filters and pump sets for use with the nozzles are also shown. A chapter is devoted to applications for spray nozzles in industry, with illustrations.

CONCRETE CONSTRUCTION — Useful and up-to-date information on concrete, plain and reinforced, is contained in a new handbook of concrete construction just issued by the Universal Atlas Cement Co., 208 South LaSalle street, Chicago. It is available to contractors, engineers and others engaged in concrete construction. It is a pocket manual of general information on concrete, applying particularly to small structures, without attempt to cover large construction requiring skilled technical handling. The 208 pages include 48 tables on quantities, sizes, loads and similar data.